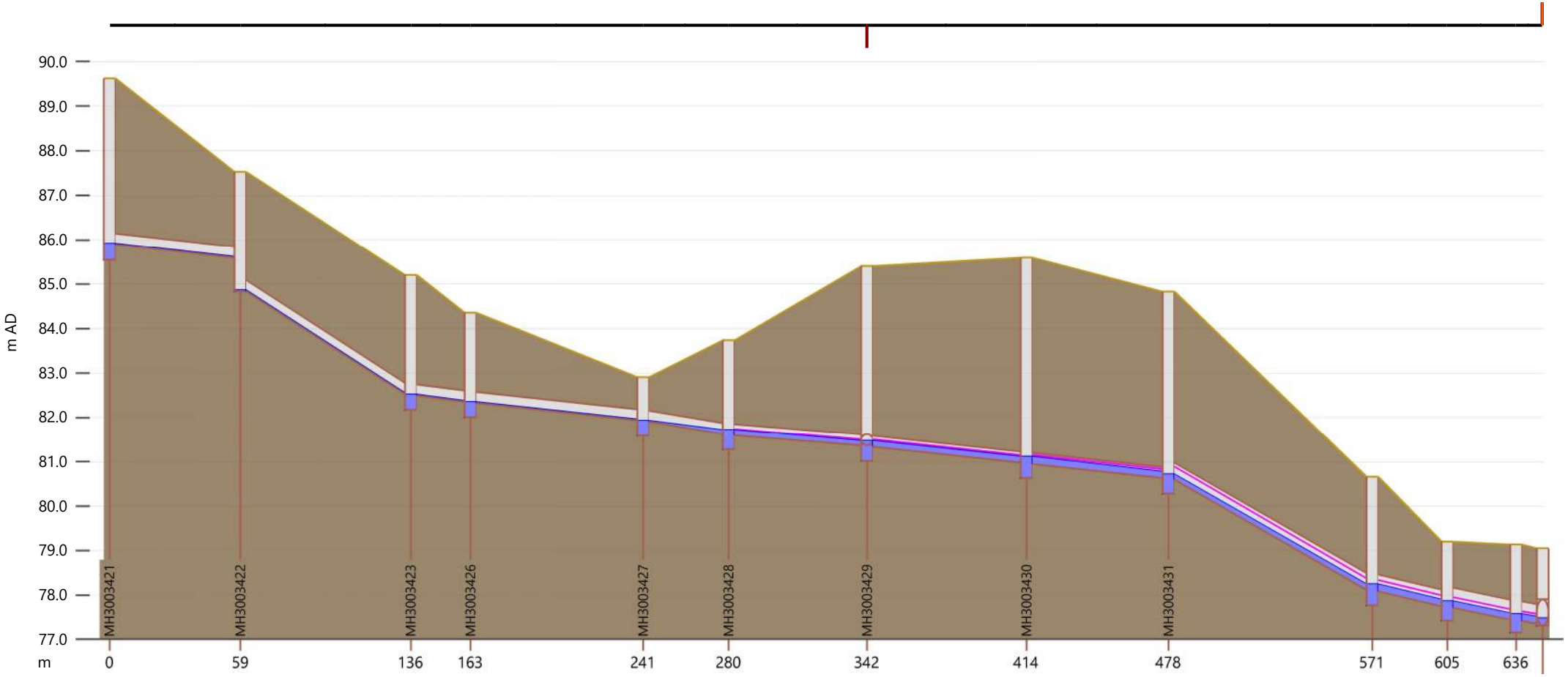
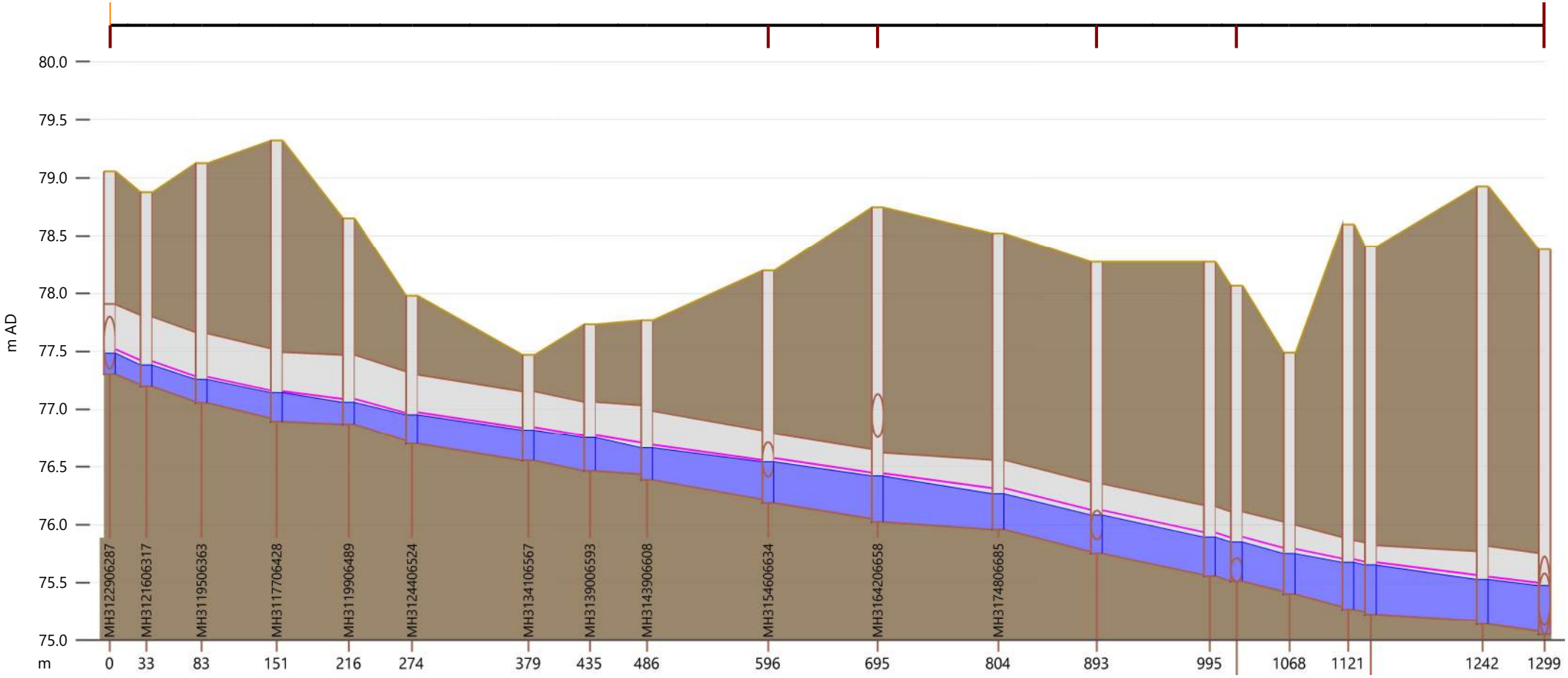


Link	MH3003421.1	MH3003422.1	-	MH3003426.1	-	MH3003428.1	MH3003429.1	MH3003430.1	MH3003431.1	-	-	-
length (m)	59.1	77.0	27.0	78.0	38.6	62.5	72.1	64.2	92.1	34.0	31.0	-
height (mm)	250	250	250	250	250	250	250	250	375	375	450	-
grad (m/m)	0.00507	0.03000	-	0.00500	0.00726	0.00368	0.00499	0.00499	0.02693	0.01000	0.00871	-
pfc (m3/s)	0.042	0.103	0.043	0.042	0.051	0.036	0.042	0.042	0.288	0.175	0.266	-
surc	0.08	0.10	0.09	0.09	0.36	0.48	0.53	0.65	0.34	0.42	0.33	-
US flow (m3/s)	0.00005	0.00010	-	0.00017	0.00019	0.01584	0.02252	0.03119	0.05293	0.05960	0.05960	-
US velocity (m/s)	0.028	0.037	0.055	0.075	0.086	0.689	0.857	0.928	1.853	1.362	1.320	-
DS flow (m3/s)	0.00005	0.00010	-	0.00017	0.00019	0.01584	0.02252	0.03119	0.05293	0.05960	0.05960	-
DS velocity (m/s)	0.028	0.037	0.056	0.076	0.012	0.840	0.847	1.061	1.609	1.362	1.320	-

Node	-	MH3003422	MH3003423	MH3003426	MH3003427	MH3003428	MH3003429	MH3003430	MH3003431	MH3003432	-	-
ground (m AD)	89.620	87.531	85.210	84.360	82.910	83.740	85.410	85.600	84.831	80.660	79.200	-
level (m AD)	85.921	84.866	82.522	82.353	81.933	81.719	81.472	81.113	80.715	78.247	77.867	-

2150 LAKESHORE BLVD._PARK LAWN PROPOSED (240 l/c/day)

ARUP

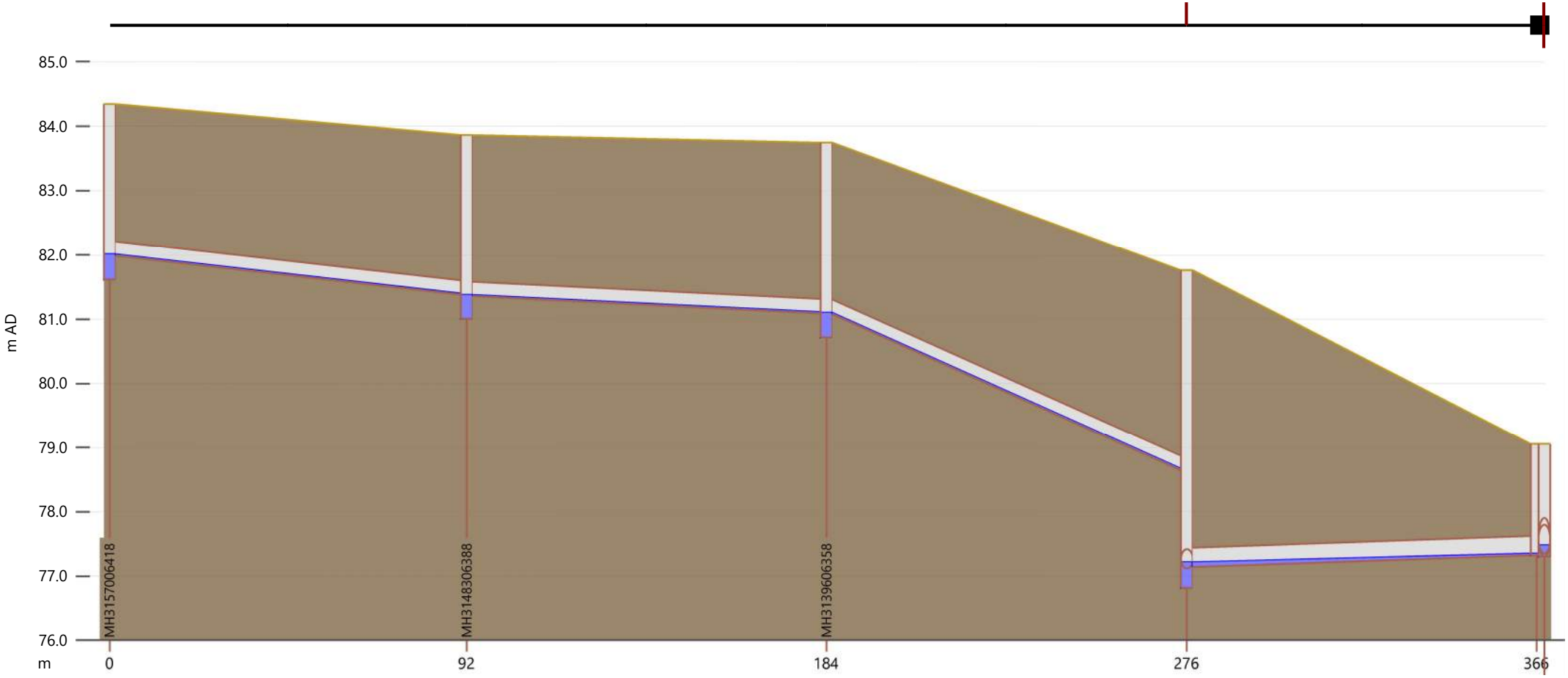


Link	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
length (m)	33.3	50.0	67.9	65.2	57.1	105.6	55.5	51.8	109.5	99.1	109.3	88.9	102.2	-	47.9	53.2	-	101.1	56.1
height (mm)	600	600	600	600	600	600	600	600	600	600	600	600	600	-	600	600	-	600	675
grad (m/m)	-	-	0.00193	0.00038	0.00252	0.00137	0.00166	-	0.00153	0.00136	0.00059	0.00216	0.00181	-	-	-	-	0.00051	0.00109
pfc (m3/s)	-	0.317	0.270	0.120	0.308	0.228	0.250	0.143	0.241	0.227	0.149	0.285	0.261	-	0.262	0.278	-	0.139	0.277
surc	0.29	0.31	0.36	0.41	0.37	0.43	0.48	0.48	0.54	0.61	0.66	0.52	0.55	-	0.56	0.64	-	0.71	0.58
US flow (m3/s)	-	-	0.06090	0.06158	0.06171	0.07839	0.09009	-	0.09687	0.14374	0.14482	0.14615	0.14929	-	-	-	-	0.15842	0.15854
US velocity (m/s)	-	0.852	0.744	0.563	0.820	0.711	0.766	0.715	0.769	0.836	0.738	1.013	0.944	-	0.977	0.933	-	0.738	0.758
DS flow (m3/s)	-	-	0.06090	0.06158	0.06171	0.07839	0.09009	-	0.09687	0.14374	0.14482	0.14615	0.14929	-	-	-	-	0.15842	0.15854
DS velocity (m/s)	-	0.795	0.663	0.818	0.645	0.667	0.679	0.983	0.627	0.801	1.003	0.978	0.964	-	1.020	0.831	-	0.916	0.734

Node	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ground (m AD)	-	79.128	79.322	78.652	77.981	77.471	-	77.768	78.199	78.747	78.522	78.274	78.276	-	-	-	78.408	78.926	-
level (m AD)	-	77.255	77.141	77.057	76.949	76.816	-	76.660	76.540	76.417	76.264	76.080	75.889	-	-	-	75.650	75.524	-

2150 LAKESHORE BLVD._MARINE PARADE DRIVE PROPOSED (240 l/c/day)

ARUP

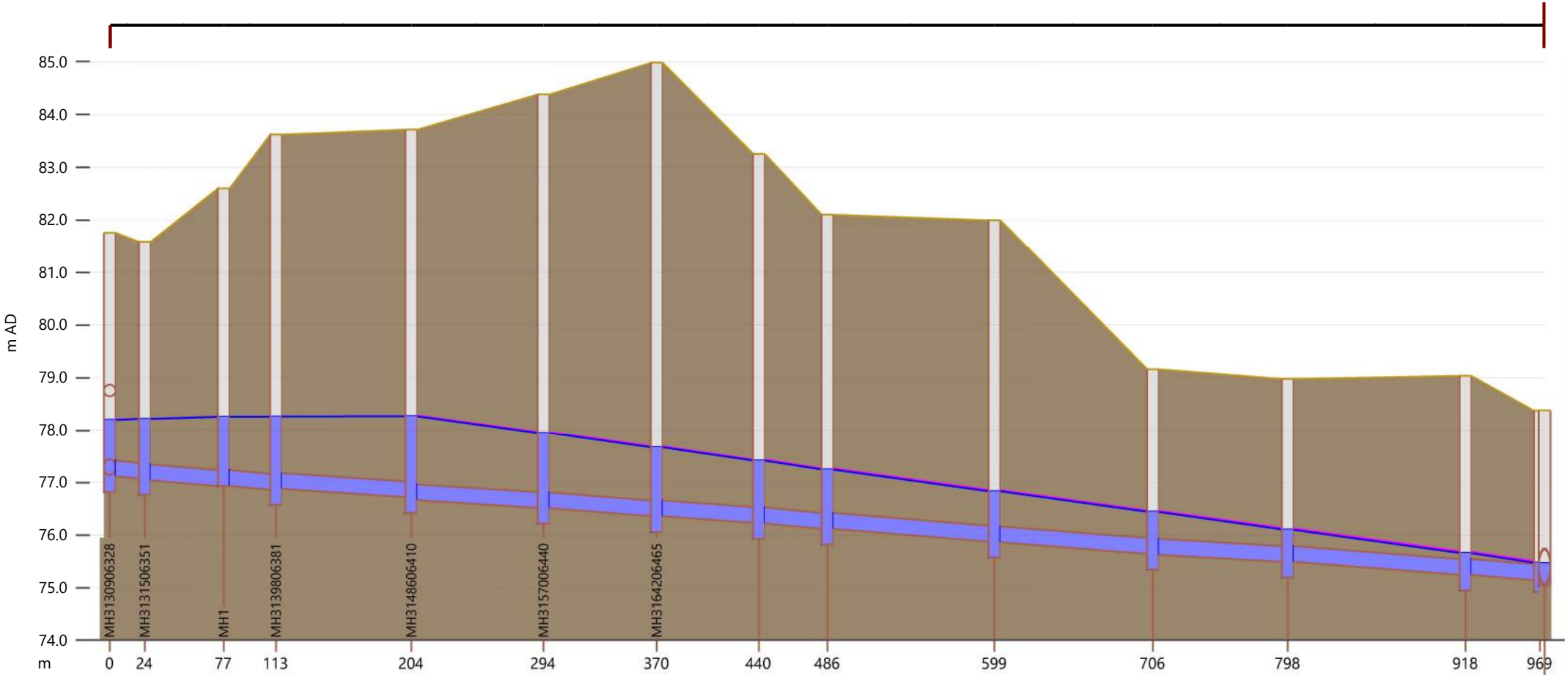


Link	MH3157006418.1	MH3148306388.1	MH3139606358.1	Dummy_Weir.2
length (m)	91.5	92.2	92.4	89.7
height (mm)	225	225	225	300
grad (m/m)	0.00665	0.00291	0.02633	0.00204
pfc (m3/s)	0.037	0.024	0.073	0.044
surc	0.09	0.09	0.10	0.25
US flow (m3/s)	0.00000	0.00000	0.00005	0.00034
US velocity (m/s)	0.000	0.000	0.024	0.110
DS flow (m3/s)	0.00000	-0.00000	0.00005	0.00034
DS velocity (m/s)	0.000	0.000	0.024	0.025

Node	MH3157006418	MH3148306388	MH3139606358	MH3130906328	Dummy_Weir
ground (m AD)	84.341	83.864	83.746	81.762	79.056
level (m AD)	82.011	81.380	81.103	77.219	77.355

2150 LAKESHORE BLVD._LAKESHORE BLVD. N PROPOSED (240 l/c/day)

ARUP

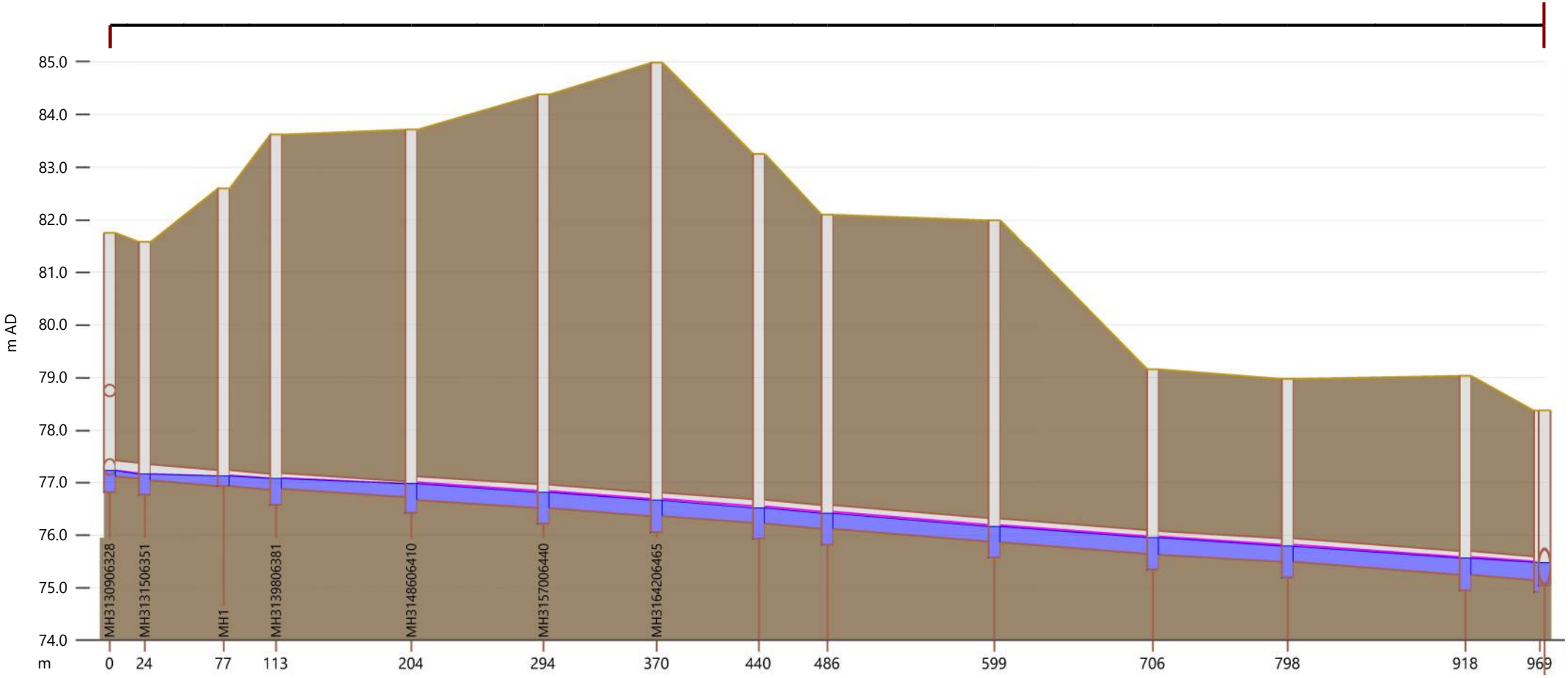


Link	-	-	MH1.1	MH3139806381.1	MH3148606410.1	-	-	-	MH3175206501.1	MH3186206526.1	MH3195006587.1	MH3202606639.1	-
length (m)	23.8	53.4	35.4	91.7	89.4	76.7	69.1	46.5	113.0	107.3	91.3	120.4	50.4
height (mm)	300	300	300	300	300	300	300	300	300	300	300	300	300
grad (m/m)	-	0.00200	-	0.00170	0.00166	0.00198	0.00181	0.00222	0.00216	0.00202	0.00150	0.00202	0.00203
pfc (m3/s)	-	0.043	0.043	0.040	0.039	0.043	0.041	0.046	0.045	0.043	0.037	0.043	0.044
surc	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
US flow (m3/s)	-	-0.02630	-	-0.01010	0.05745	0.05749	0.05753	0.05755	0.05761	0.05768	0.05772	0.05772	0.05772
US velocity (m/s)	-	-0.290	-0.108	-0.107	0.580	0.601	0.618	0.634	0.644	0.668	0.694	0.729	0.768
DS flow (m3/s)	-	-0.02630	-	-0.01010	0.05745	0.05749	0.05753	0.05755	0.05761	0.05768	0.05772	0.05772	0.05772
DS velocity (m/s)	-	-0.281	-0.106	-0.103	0.601	0.617	0.634	0.643	0.668	0.696	0.728	0.766	0.787

Node	-	MH1	-	MH3148606410	-	-	-	-	MH3186206526	MH3195006587	MH3202606639	-	-
ground (m AD)	-	82.600	83.622	83.716	84.378	84.980	83.256	82.108	81.997	79.165	78.982	79.040	-
level (m AD)	-	78.261	78.265	78.275	77.951	77.673	77.421	77.250	76.839	76.446	76.111	75.668	-

2150 LAKESHORE BLVD._LAKESHORE BLVD. S PROPOSED (240 l/c/day, No Upgrades)

ARUP

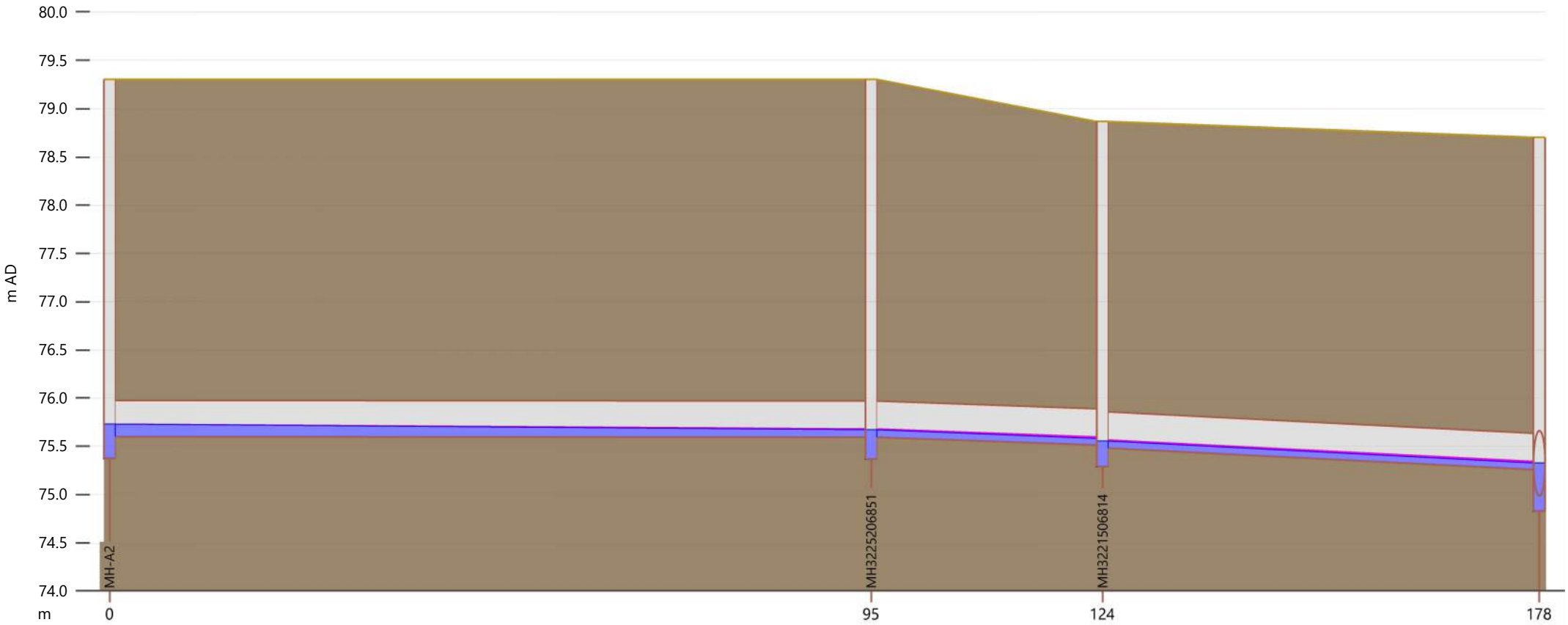


Link	-	-	MH1.1	MH3139806381.1	MH3148606410.1	-	-	-	MH3175206501.1	MH3186206526.1	MH3195006587.1	MH3202606639.1	-
length (m)	23.8	53.4	35.4	91.7	89.4	76.7	69.1	46.5	113.0	107.3	91.3	120.4	50.4
height (mm)	300	300	300	300	450	450	450	450	450	450	450	450	450
grad (m/m)	-	0.00200	-	0.00170	0.00166	0.00198	0.00181	0.00222	0.00216	0.00202	0.00150	0.00202	0.00203
pfc (m3/s)	-	0.043	0.043	0.040	0.116	0.127	0.121	0.134	0.132	0.128	0.110	0.128	0.128
surc	0.33	0.61	0.68	0.83	0.67	0.65	0.65	0.63	0.63	0.66	0.70	0.68	0.73
US flow (m3/s)	-	0.01031	-	0.02651	0.09406	0.09410	0.09414	0.09417	0.09422	0.09429	0.09433	0.09433	0.09433
US velocity (m/s)	-	0.433	0.589	0.562	0.826	0.869	0.858	0.895	0.891	0.874	0.793	0.874	0.825
DS flow (m3/s)	-	0.01031	-	0.02651	0.09406	0.09410	0.09414	0.09417	0.09422	0.09429	0.09433	0.09433	0.09433
DS velocity (m/s)	-	0.229	0.517	0.424	0.886	0.854	0.929	0.886	0.913	0.842	0.870	0.821	0.761

Node	-	MH1	-	MH3148606410	-	-	-	-	MH3186206526	MH3195006587	MH3202606639	-	-
ground (m AD)	-	82.600	83.622	83.716	84.378	84.980	83.256	82.108	81.997	79.165	78.982	79.040	-
level (m AD)	-	77.120	77.070	76.972	76.805	76.656	76.511	76.409	76.158	75.949	75.786	75.558	-

2150 LAKESHORE BLVD._LAKESHORE BLVD. S PROPOSED (240 l/c/day, 450mm Upgrades)

ARUP

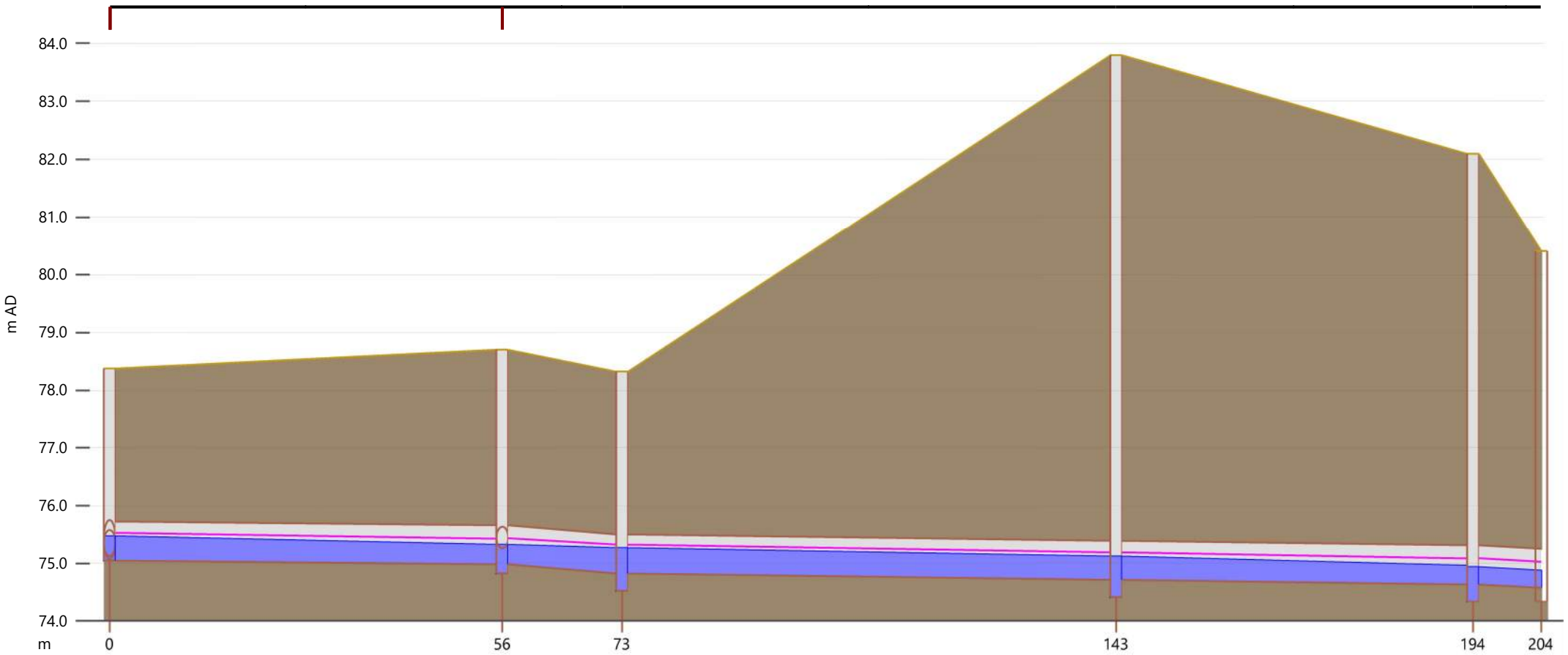


Link	MH-A2.1	MH3225206851.1	MH3221506814.1
length (m)	95.0	28.9	54.4
height (mm)	375	375	375
grad (m/m)	0.00007	0.00274	0.00404
pfc (m3/s)	0.015	0.092	0.111
surc	0.33	0.20	0.18
US flow (m3/s)	0.00712	0.00735	0.00735
US velocity (m/s)	0.220	0.472	0.536
DS flow (m3/s)	0.00712	0.00735	0.00735
DS velocity (m/s)	0.458	0.612	0.606

Node	MH-A2	MH3225206851	MH3221506814	MH3216306785
ground (m AD)	79.303	79.303	78.871	78.707
level (m AD)	75.725	75.667	75.549	75.323

2150 LAKESHORE BLVD._PALACE PIER PROPOSED (240 l/c/day)

ARUP

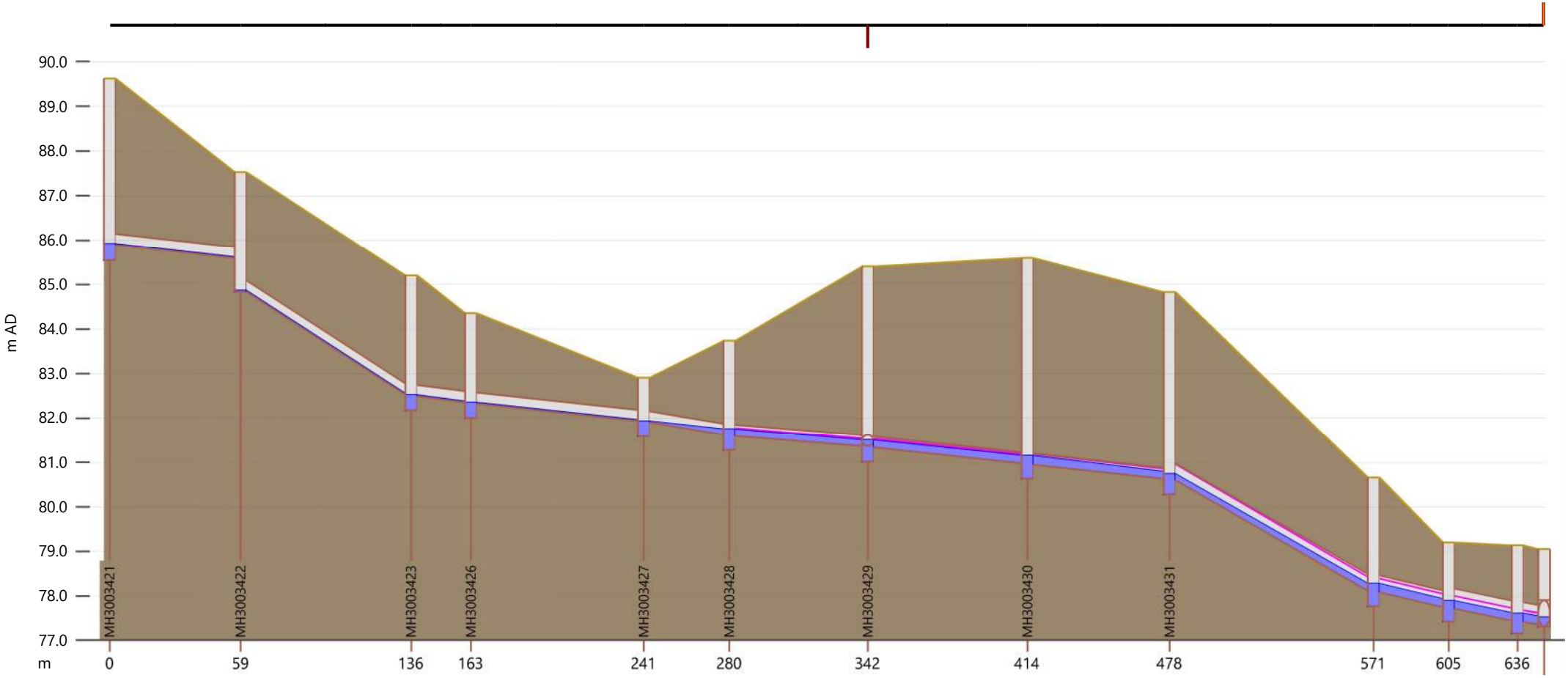


Link	MH3214406765.1	-	MH3217306776.1	MH3223606714.1	-
length (m)	55.9	17.0	70.3	50.8	9.7
height (mm)	675	675	675	675	675
grad (m/m)	0.00115	0.00921	0.00157	0.00158	0.00620
pfc (m3/s)	0.285	0.807	0.333	0.334	0.662
surc	0.62	0.65	0.65	0.59	0.44
US flow (m3/s)	0.25901	0.26656	0.26656	0.26669	0.26692
US velocity (m/s)	1.107	1.499	1.087	1.208	1.751
DS flow (m3/s)	0.25901	0.26656	0.26656	0.26669	0.26692
DS velocity (m/s)	1.455	1.082	1.201	1.565	1.751

Node	MH3214406765	MH3216306785	MH3217306776	MH3223606714	MH3222206653	-
ground (m AD)	78.383	78.707	78.330	83.793	82.096	-
level (m AD)	75.472	75.323	75.269	75.121	74.938	

2150 LAKESHORE BLVD._GARDINER PROPOSED (240 l/c/day)

ARUP

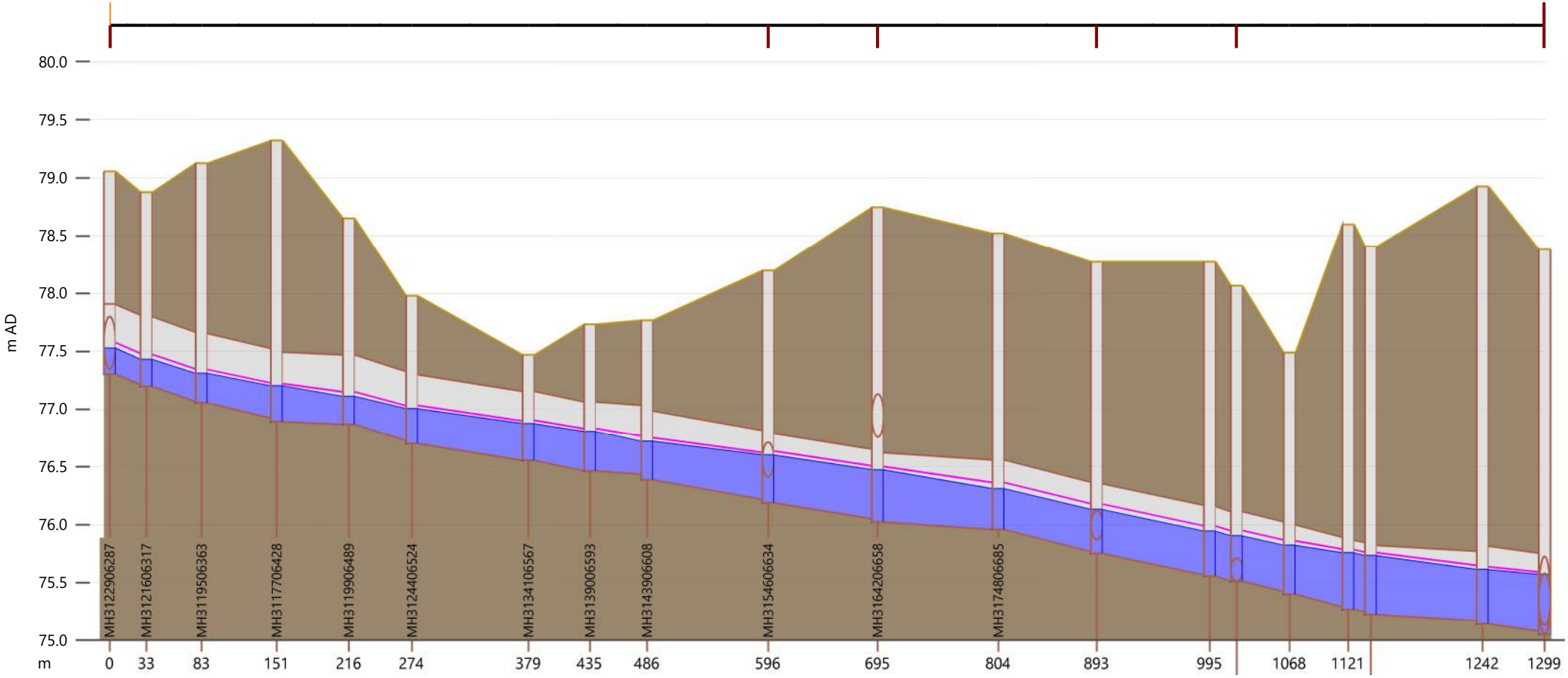


Link	MH3003421.1	MH3003422.1	-	MH3003426.1	-	MH3003428.1	MH3003429.1	MH3003430.1	MH3003431.1	-	-	-
length (m)	59.1	77.0	27.0	78.0	38.6	62.5	72.1	64.2	92.1	34.0	31.0	-
height (mm)	250	250	250	250	250	250	250	250	375	375	450	-
grad (m/m)	0.00507	0.03000	-	0.00500	0.00726	0.00368	0.00499	0.00499	0.02693	0.01000	0.00871	-
pfc (m3/s)	0.042	0.103	0.043	0.042	0.051	0.036	0.042	0.042	0.288	0.175	0.266	-
surc	0.08	0.10	0.09	0.09	0.48	0.59	0.67	0.78	0.42	0.50	0.39	-
US flow (m3/s)	0.00005	0.00010	-	0.00017	0.00019	0.02364	0.03032	0.03899	0.07612	0.08278	0.08278	-
US velocity (m/s)	0.028	0.037	0.055	0.075	0.086	0.777	0.915	0.951	2.097	1.510	1.465	-
DS flow (m3/s)	0.00005	0.00010	-	0.00017	0.00019	0.02364	0.03032	0.03899	0.07612	0.08278	0.08278	-
DS velocity (m/s)	0.028	0.037	0.056	0.076	0.008	0.907	0.868	1.159	1.743	1.510	1.465	-

Node	-	MH3003422	MH3003423	MH3003426	MH3003427	MH3003428	MH3003429	MH3003430	MH3003431	MH3003432	-	-
ground (m AD)	89.620	87.531	85.210	84.360	82.910	83.740	85.410	85.600	84.831	80.660	79.200	-
level (m AD)	85.921	84.866	82.522	82.353	81.933	81.749	81.501	81.147	80.737	78.277	77.894	-

2150 LAKESHORE BLVD._PARK LAWN PROPOSED (450 l/c/day)

ARUP

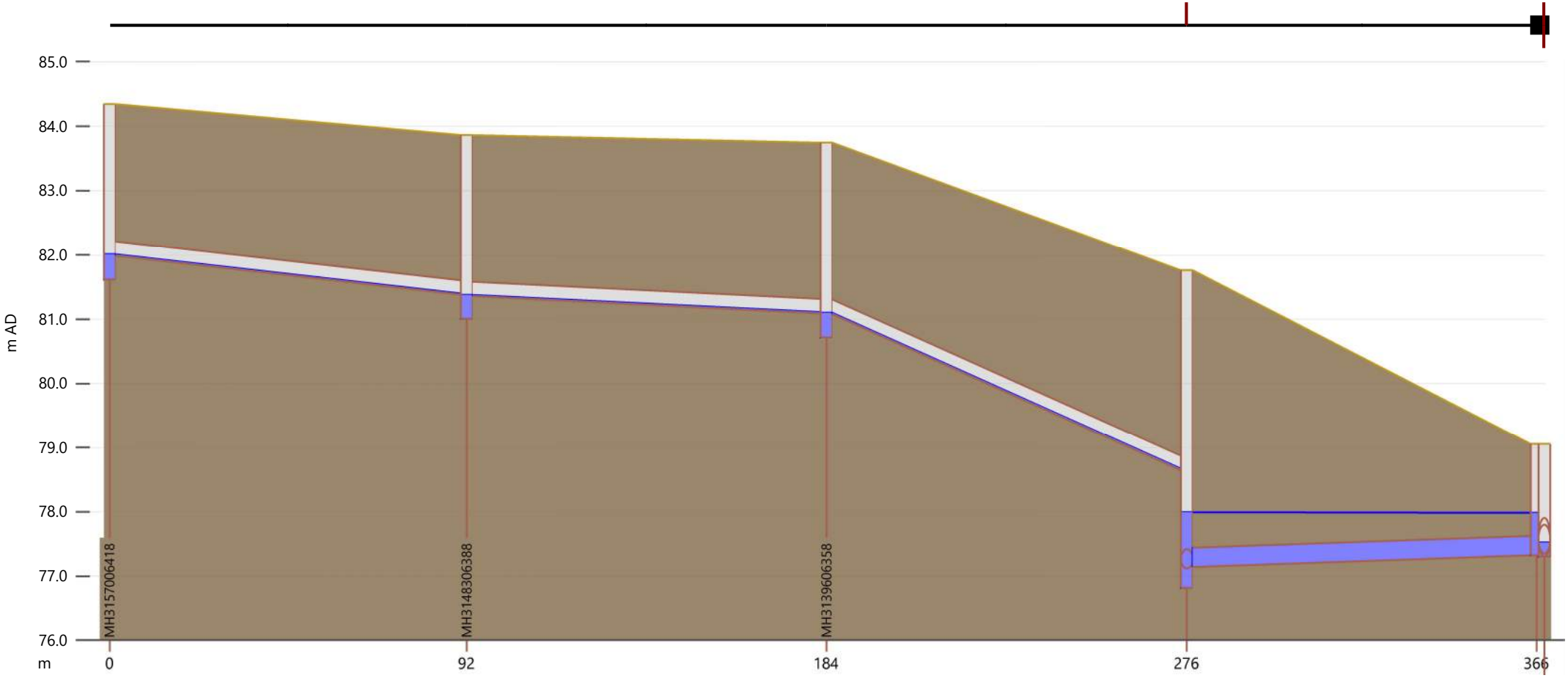


Link	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
length (m)	33.3	50.0	67.9	65.2	57.1	105.6	55.5	51.8	109.5	99.1	109.3	88.9	102.2	-	47.9	53.2	-	101.1	56.1
height (mm)	600	600	600	600	600	600	600	600	600	600	600	600	600	-	600	600	-	600	675
grad (m/m)	-	-	0.00193	0.00038	0.00252	0.00137	0.00166	-	0.00153	0.00136	0.00059	0.00216	0.00181	-	-	-	-	0.00051	0.00109
pfc (m3/s)	-	0.317	0.270	0.120	0.308	0.228	0.250	0.143	0.241	0.227	0.149	0.285	0.261	-	0.262	0.278	-	0.139	0.277
surc	0.37	0.40	0.46	0.51	0.46	0.53	0.57	0.57	0.64	0.70	0.74	0.60	0.63	-	0.66	0.78	-	0.85	0.73
US flow (m3/s)	-	-	0.09541	0.09609	0.09622	0.11290	0.12459	-	0.13137	0.17825	0.17932	0.18065	0.18378	-	-	-	-	0.19291	0.19301
US velocity (m/s)	-	0.960	0.843	0.663	0.917	0.792	0.822	0.781	0.817	0.865	0.795	1.061	0.985	-	0.993	0.912	-	0.757	0.727
DS flow (m3/s)	-	-	0.09541	0.09609	0.09622	0.11289	0.12459	-	0.13137	0.17825	0.17932	0.18065	0.18378	-	-	-	-	0.19290	0.19301
DS velocity (m/s)	-	0.887	0.751	0.916	0.754	0.744	0.750	0.987	0.691	0.847	1.050	1.011	0.987	-	0.972	0.818	-	0.867	0.694

Node	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ground (m AD)	-	79.128	79.322	78.652	77.981	77.471	-	77.768	78.199	78.747	78.522	78.274	78.276	-	-	-	78.408	78.926	-
level (m AD)	-	77.309	77.201	77.109	77.003	76.873	-	76.719	76.600	76.471	76.308	76.129	75.942	-	-	-	75.732	75.611	-

2150 LAKESHORE BLVD._MARINE PARADE DRIVE PROPOSED (450 l/c/day)

ARUP

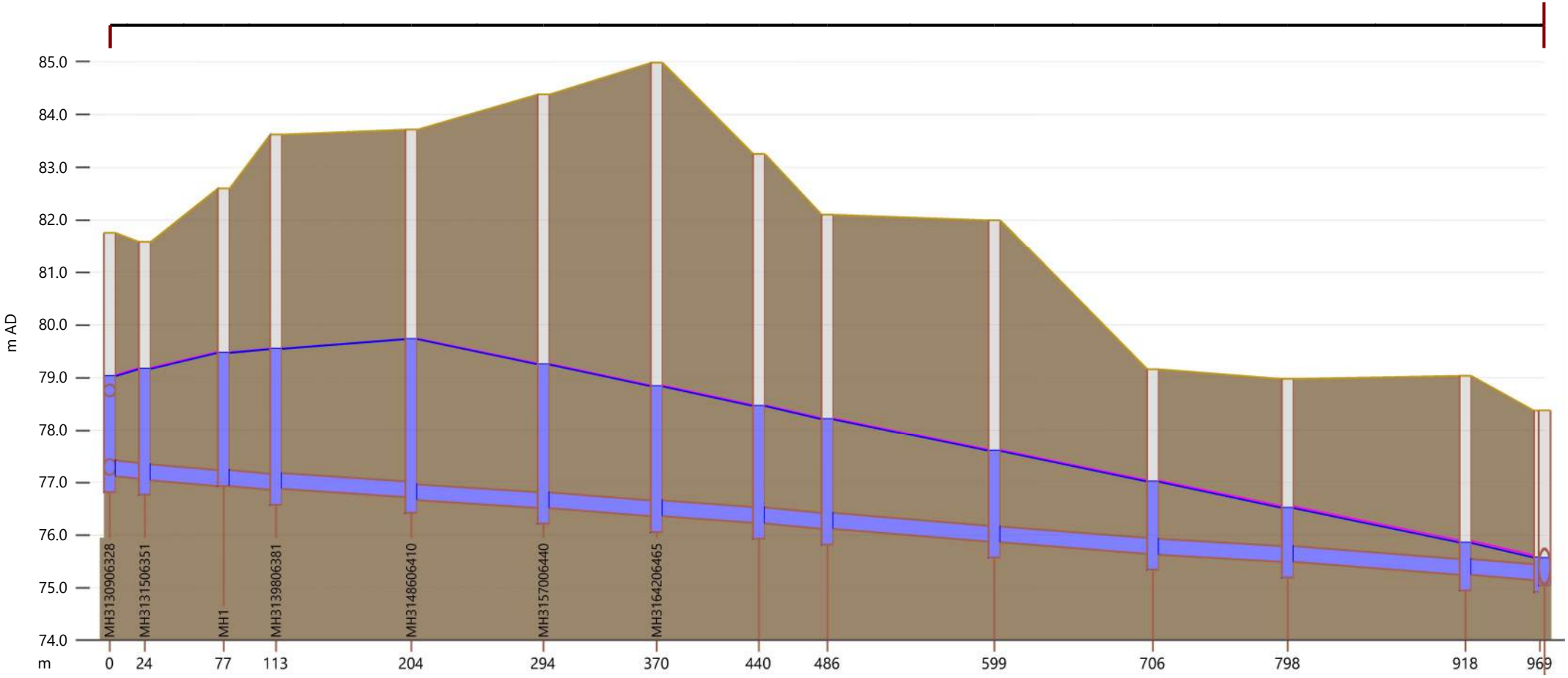


Link	MH3157006418.1	MH3148306388.1	MH3139606358.1	Dummy_Weir.2
length (m)	91.5	92.2	92.4	89.7
height (mm)	225	225	225	300
grad (m/m)	0.00665	0.00291	0.02633	0.00204
pfc (m3/s)	0.037	0.024	0.073	0.044
surc	0.09	0.09	0.10	1.00
US flow (m3/s)	0.00000	0.00000	0.00005	-0.01098
US velocity (m/s)	0.000	0.000	0.024	-0.137
DS flow (m3/s)	-0.00000	-0.00000	0.00005	-0.01098
DS velocity (m/s)	0.000	0.000	0.024	-0.131

Node	MH3157006418	MH3148306388	MH3139606358	MH3130906328	Dummy_Weir
ground (m AD)	84.341	83.864	83.746	81.762	79.056
level (m AD)	82.011	81.380	81.103	77.998	77.987

2150 LAKESHORE BLVD._LAKESHORE BLVD. N PROPOSED (450 l/c/day)

ARUP

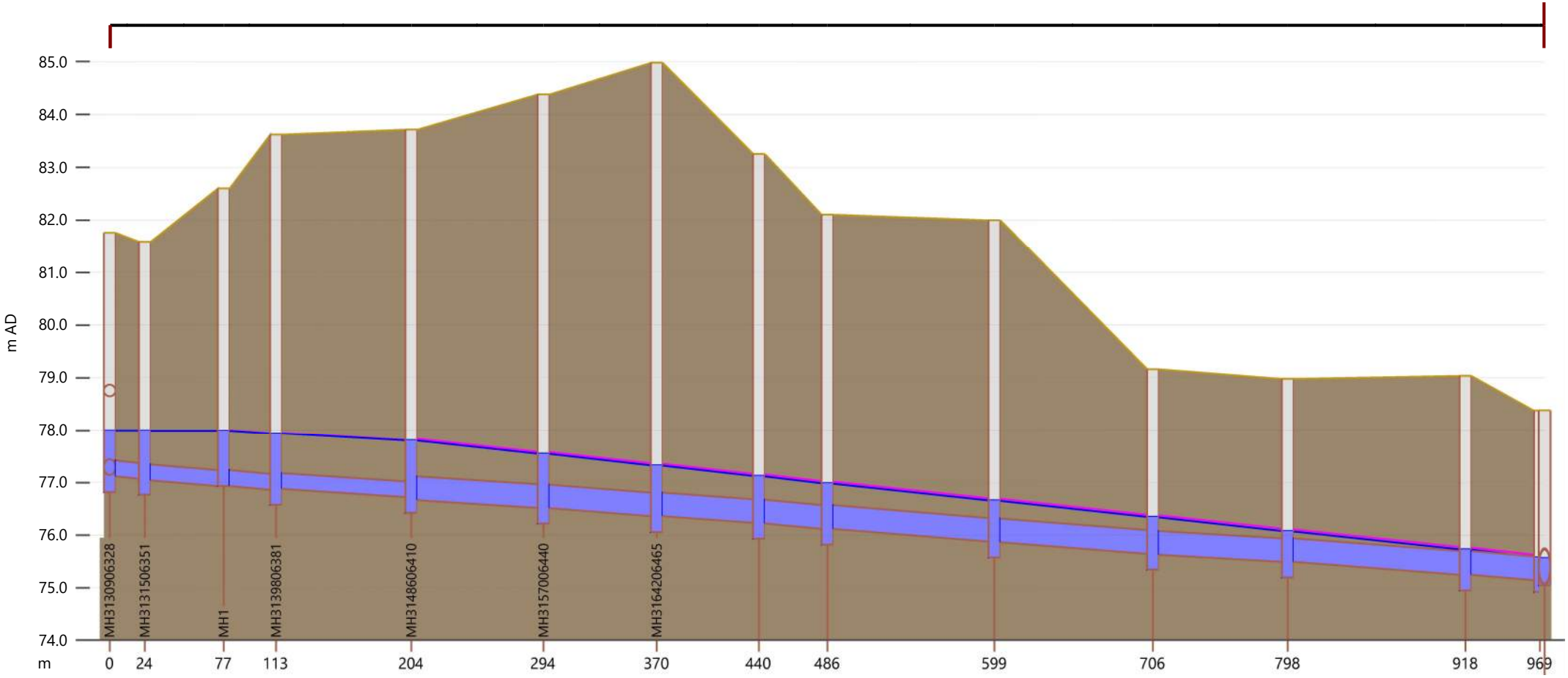


Link	-	-	MH1.1	MH3139806381.1	MH3148606410.1	-	-	-	MH3175206501.1	MH3186206526.1	MH3195006587.1	MH3202606639.1	-
length (m)	23.8	53.4	35.4	91.7	89.4	76.7	69.1	46.5	113.0	107.3	91.3	120.4	50.4
height (mm)	300	300	300	300	300	300	300	300	300	300	300	300	300
grad (m/m)	-	0.00200	-	0.00170	0.00166	0.00198	0.00181	0.00222	0.00216	0.00202	0.00150	0.00202	0.00203
pfc (m3/s)	-	0.043	0.043	0.040	0.039	0.043	0.041	0.046	0.045	0.043	0.037	0.043	0.044
surc	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
US flow (m3/s)	-	-0.07289	-	-0.04368	0.07024	0.07028	0.07032	0.07034	0.07040	0.07047	0.07051	0.07051	0.07051
US velocity (m/s)	-	-0.665	-0.371	-0.363	0.547	0.577	0.603	0.629	0.647	0.693	0.745	0.807	0.893
DS flow (m3/s)	-	-0.07289	-	-0.04368	0.07024	0.07028	0.07032	0.07034	0.07040	0.07047	0.07051	0.07051	0.07051
DS velocity (m/s)	-	-0.619	-0.362	-0.343	0.577	0.603	0.630	0.646	0.694	0.747	0.806	0.891	0.933

Node	-	MH1	-	MH3148606410	-	-	-	-	MH3186206526	MH3195006587	MH3202606639	-	-
ground (m AD)	-	82.600	83.622	83.716	84.378	84.980	83.256	82.108	81.997	79.165	78.982	79.040	-
level (m AD)	-	79.478	79.550	79.736	79.256	78.842	78.469	78.216	77.604	77.020	76.521	75.861	-

2150 LAKESHORE BLVD._LAKESHORE BLVD. S PROPOSED (450 l/c/day, No Upgrades)

ARUP

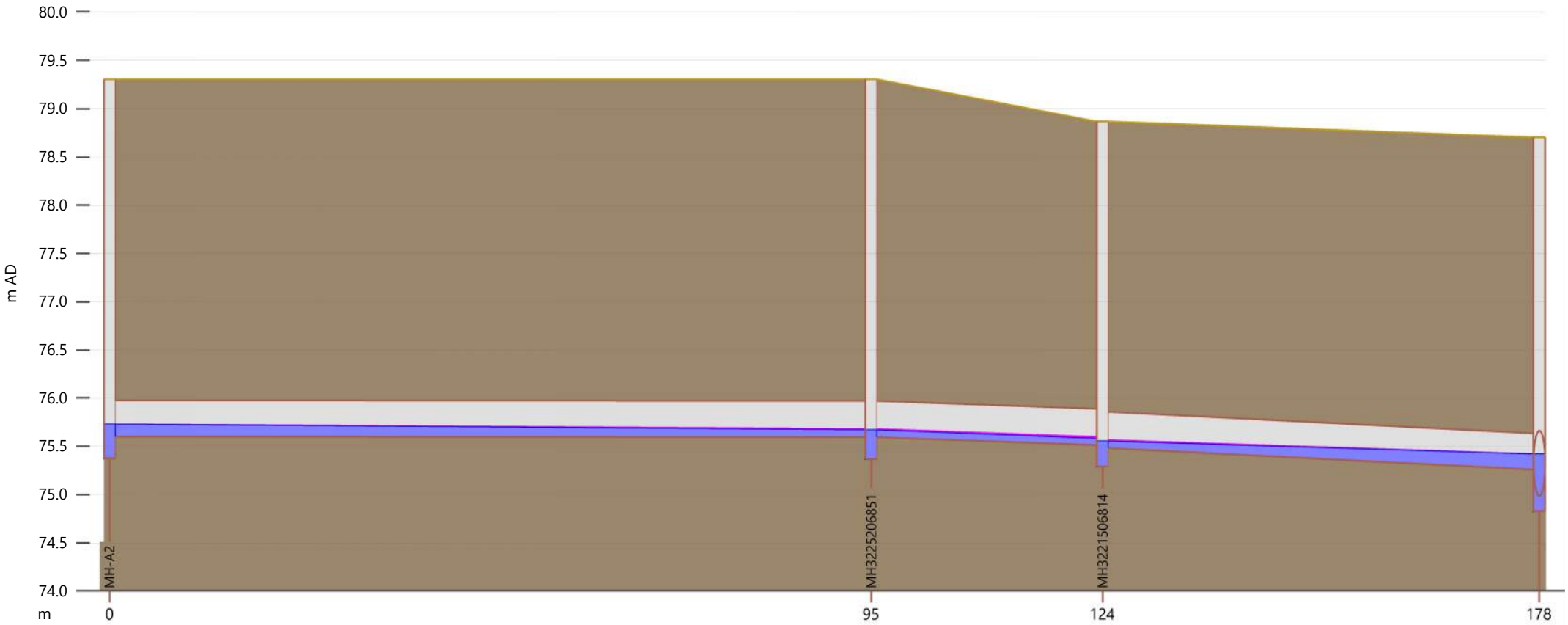


Link	-	-	MH1.1	MH3139806381.1	MH3148606410.1	-	-	-	MH3175206501.1	MH3186206526.1	MH3195006587.1	MH3202606639.1	-
length (m)	23.8	53.4	35.4	91.7	89.4	76.7	69.1	46.5	113.0	107.3	91.3	120.4	50.4
height (mm)	300	300	300	300	450	450	450	450	450	450	450	450	450
grad (m/m)	-	0.00200	-	0.00170	0.00166	0.00198	0.00181	0.00222	0.00216	0.00202	0.00150	0.00202	0.00203
pfc (m3/s)	-	0.043	0.043	0.040	0.116	0.127	0.121	0.134	0.132	0.128	0.110	0.128	0.128
surc	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
US flow (m3/s)	-	0.00713	-	0.03634	0.15026	0.15030	0.15034	0.15036	0.15042	0.15049	0.15053	0.15053	0.15053
US velocity (m/s)	-	0.083	0.413	0.412	0.844	0.854	0.861	0.868	0.872	0.879	0.888	0.902	0.920
DS flow (m3/s)	-	0.00713	-	0.03634	0.15026	0.15030	0.15034	0.15036	0.15042	0.15049	0.15053	0.15053	0.15053
DS velocity (m/s)	-	0.081	0.411	0.410	0.854	0.860	0.868	0.871	0.879	0.888	0.901	0.917	0.957

Node	-	MH1	-	MH3148606410	-	-	-	-	MH3186206526	MH3195006587	MH3202606639	-	-
ground (m AD)	-	82.600	83.622	83.716	84.378	84.980	83.256	82.108	81.997	79.165	78.982	79.040	-
level (m AD)	-	77.993	77.941	77.807	77.551	77.329	77.128	76.989	76.663	76.351	76.083	75.734	-

2150 LAKESHORE BLVD._LAKESHORE BLVD. S PROPOSED (450 l/c/day, 450mm Upgrades)

ARUP

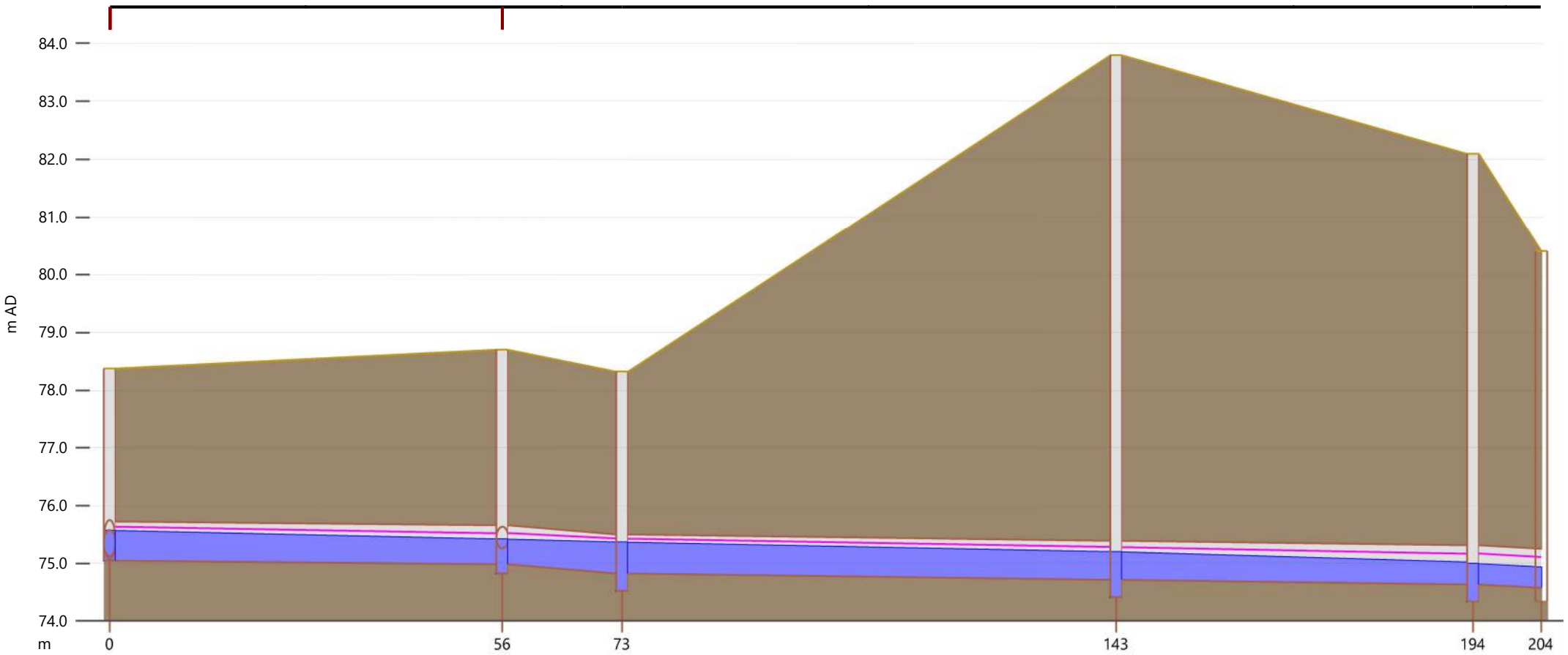


Link	MH-A2.1	MH3225206851.1	MH3221506814.1
length (m)	95.0	28.9	54.4
height (mm)	375	375	375
grad (m/m)	0.00007	0.00274	0.00404
pfc (m3/s)	0.015	0.092	0.111
surc	0.33	0.20	0.41
US flow (m3/s)	0.00712	0.00735	0.00735
US velocity (m/s)	0.220	0.472	0.534
DS flow (m3/s)	0.00712	0.00735	0.00735
DS velocity (m/s)	0.458	0.612	0.170

Node	MH-A2	MH3225206851	MH3221506814	MH3216306785
ground (m AD)	79.303	79.303	78.871	78.707
level (m AD)	75.725	75.667	75.549	75.416

2150 LAKESHORE BLVD._PALACE PIER PROPOSED (450 l/c/day)

ARUP



Link	MH3214406765.1	-	MH3217306776.1	MH3223606714.1	-
length (m)	55.9	17.0	70.3	50.8	9.7
height (mm)	675	675	675	675	675
grad (m/m)	0.00115	0.00921	0.00157	0.00158	0.00620
pfc (m3/s)	0.285	0.807	0.333	0.334	0.662
surc	0.76	0.79	0.79	0.70	0.52
US flow (m3/s)	0.34967	0.35723	0.35723	0.35735	0.35757
US velocity (m/s)	1.195	1.500	1.185	1.333	1.883
DS flow (m3/s)	0.34967	0.35723	0.35722	0.35734	0.35757
DS velocity (m/s)	1.455	1.175	1.320	1.731	1.883

Node	MH3214406765	MH3216306785	MH3217306776	MH3223606714	MH3222206653	-
ground (m AD)	78.383	78.707	78.330	83.793	82.096	-
level (m AD)	75.569	75.416	75.364	75.197	74.995	

2150 LAKESHORE BLVD._GARDINER PROPOSED (450 l/c/day)

ARUP

SANITARY CAPACITY ANALYSIS RESULTS (EXISTING/ PROPOSED/ PROPOSED UPGRADES)

Location: 2150 Lakeshore Boulevard Checked date: 02/24/2021 Created by: PC Reviewed by: FF

Location	Manhole			Pipe						Flow (q)		Flow (q/Q_{cap})			Depth (d)		Depth (d/D)	
	US	Link Suffix	DS	Size (D)	Upgrade Size	Length	Slope	Q_{cap}	Upgraded size Q_{cap}	Pre	Post	Pre	Post	Post Upgraded size	Pre	Post	Pre	Post
Street Name	MH		MH	m	m	m	%	m^3/s	m^3/s	m^3/s	m^3/s				m	m		
PARK LAWN	MH3003421	1	MH3003422	0.250	0.000	59.10	0.51	0.042	-	0.000	0.000	0.001	0.001	-	0.02	0.02	0.08	0.08
PARK LAWN	MH3003422	1	MH3003423	0.250	0.000	77.00	3.00	0.103	-	0.000	0.000	0.001	0.001	-	0.03	0.03	0.10	0.10
PARK LAWN	MH3003423	1	MH3003426	0.250	0.000	27.00	0.52	0.043	-	0.000	0.000	0.003	0.003	-	0.02	0.02	0.09	0.09
PARK LAWN	MH3003426	1	MH3003427	0.250	0.000	78.00	0.50	0.042	-	0.000	0.000	0.004	0.004	-	0.02	0.02	0.09	0.09
PARK LAWN	MH3003427	1	MH3003428	0.250	0.000	38.60	0.73	0.051	-	0.000	0.000	0.004	0.004	-	0.02	0.09	0.09	0.36
PARK LAWN	MH3003428	1	MH3003429	0.250	0.000	62.50	0.37	0.036	-	0.000	0.016	0.006	0.440	-	0.04	0.10	0.16	0.41
PARK LAWN	MH3138005979	1	MH-A1	0.225	0.000	59.10	0.38	0.028	-	0.007	0.007	0.237	0.237	-	0.07	0.07	0.30	0.30
PARK LAWN	MH-A1	1	MH3003429	0.250	0.000	4.20	16.21	0.239	-	0.007	0.007	0.028	0.028	-	0.04	0.10	0.16	0.41
PARK LAWN	MH3003429	1	MH3003430	0.250	0.000	72.10	0.50	0.042	-	0.007	0.023	0.164	0.536	-	0.07	0.13	0.27	0.53
PARK LAWN	MH3003430	1	MH3003431	0.250	0.000	64.20	0.50	0.042	-	0.009	0.031	0.215	0.743	-	0.08	0.14	0.31	0.58
PARK LAWN	MH3003431	1	MH3003432	0.375	0.000	92.10	2.69	0.288	-	0.012	0.053	0.042	0.184	-	0.06	0.13	0.17	0.34
PARK LAWN	MH3003432	1	MH12.5A	0.375	0.000	34.00	1.00	0.175	-	0.019	0.060	0.107	0.341	-	0.09	0.16	0.24	0.42
PARK LAWN	MH12.5A	1	MH3003433	0.450	0.000	31.00	0.87	0.266	-	0.019	0.060	0.070	0.224	-	0.08	0.15	0.19	0.33
PARK LAWN	MH3003433	1	MH3122906287	0.450	0.000	12.00	0.50	0.202	-	0.019	0.060	0.093	0.295	-	0.09	0.17	0.21	0.37
MARINE PARADE	MH3122906287	1	MH3121606317	0.600	0.000	33.30	0.27	0.321	-	0.019	0.060	0.059	0.186	-	0.09	0.17	0.15	0.28
MARINE PARADE	MH3121606317	1	MH3119506363	0.600	0.000	50.00	0.27	0.317	-	0.020	0.061	0.062	0.191	-	0.11	0.19	0.18	0.32
MARINE PARADE	MH3119506363	1	MH3117706428	0.600	0.000	67.90	0.19	0.270	-	0.020	0.061	0.074	0.226	-	0.12	0.22	0.20	0.36
MARINE PARADE	MH3117706428	1	MH3119906489	0.600	0.000	65.20	0.04	0.120	-	0.021	0.062	0.172	0.513	-	0.11	0.19	0.18	0.31
MARINE PARADE	MH3119906489	1	MH3124406524	0.600	0.000	57.10	0.25	0.308	-	0.021	0.062	0.067	0.200	-	0.14	0.22	0.24	0.37
MARINE PARADE	MH3124406524	1	MH3134106567	0.600	0.000	105.60	0.14	0.228	-	0.037	0.078	0.164	0.344	-	0.16	0.26	0.27	0.43
MARINE PARADE	MH3134106567	1	MH3139006593	0.600	0.000	55.50	0.17	0.250	-	0.037	0.090	0.150	0.360	-	0.19	0.29	0.32	0.48
MARINE PARADE	MH3139006593	1	MH3143906608	0.600	0.000	51.80	0.05	0.143	-	0.042	0.095	0.296	0.664	-	0.13	0.22	0.22	0.37
MARINE PARADE	MH3143906608	1	MH3154606634	0.600	0.000	109.50	0.15	0.241	-	0.044	0.097	0.184	0.402	-	0.24	0.32	0.40	0.54
MARINE PARADE	MH3154606634	1	MH3164206658	0.600	0.000	99.10	0.14	0.227	-	0.091	0.144	0.401	0.633	-	0.28	0.36	0.46	0.61
MARINE PARADE	MH3164206658	1	MH3174806685	0.600	0.000	109.30	0.06	0.149	-	0.092	0.145	0.619	0.972	-	0.24	0.31	0.40	0.51
MARINE PARADE	MH3174806685	1	MH3183006719	0.600	0.000	88.90	0.22	0.285	-	0.094	0.146	0.328	0.513	-	0.24	0.31	0.40	0.52
MARINE PARADE	MH3183006719	1	MH3192706752	0.600	0.000	102.20	0.18	0.261	-	0.097	0.149	0.370	0.572	-	0.25	0.32	0.41	0.54
MARINE PARADE	MH3192706752	1	MH3194806739	0.600	0.000	24.50	0.18	0.263	-	0.097	0.149	0.368	0.568	-	0.26	0.34	0.43	0.56
MARINE PARADE	MH3194806739	1	MH3199006716	0.600	0.000	47.90	0.18	0.262	-	0.105	0.158	0.403	0.603	-	0.24	0.32	0.40	0.54
MARINE PARADE	MH3199006716	1	MH3201506669	0.600	0.000	53.20	0.21	0.278	-	0.106	0.158	0.379	0.569	-	0.29	0.38	0.48	0.64
MARINE PARADE	MH3201506669	1	MH3203106656	0.600	0.000	20.40	0.09	0.183	-	0.106	0.158	0.577	0.864	-	0.31	0.40	0.51	0.67
MARINE PARADE	MH3203106656	1	MH3209906731	0.600	0.000	101.10	0.05	0.139	-	0.106	0.158	0.761	*1.14	-	0.25	0.35	0.41	0.59
MARINE PARADE	MH3209906731	1	MH3214406765	0.675	0.000	56.10	0.11	0.277	-	0.106	0.159	0.382	0.572	-	0.24	0.39	0.36	0.58
LAKESHORE	MH3157006418	1	MH3148306388	0.225	0.000	91.50	0.67	0.037	-	0.000	0.000	0.000	0.000	-	0.02	0.02	0.09	0.09
LAKESHORE	MH3148306388	1	MH3139606358	0.225	0.000	92.20	0.29	0.024	-	0.000	0.000	0.000	0.000	-	0.02	0.02	0.09	0.09
LAKESHORE	MH3139606358	1	MH3130906328	0.225	0.000	92.40	2.63	0.073	-	0.000	0.000	0.001	0.001	-	0.02	0.02	0.10	0.10
LAKESHORE	Dummy_Weir	1	MH3130906328	0.300	0.000	89.70	0.20	0.044	-	0.000	0.000	0.008	0.008	-	0.03	0.07	0.08	0.25
LAKESHORE	MH3130906328	1	MH3131506351	0.300	0.000	23.80	0.20	0.043	-	0.000	0.010	0.010	0.238	-	0.03	0.08	0.08	0.28
LAKESHORE	MH3131506351	1	MH3139806381	0.300	0.000	88.80	0.20	0.043	-	0.000	0.010	0.011	0.240	-	0.04	0.18	0.15	0.61
LAKESHORE	MH3139806381	1	MH3148606410	0.300	0.000	91.70	0.17	0.040	-	0.000	0.027	0.012	0.663	-	0.03	0.25	0.09	0.83
LAKESHORE	MH3148606410	1	MH3157006440	0.300	0.450	89.40	0.17	0.039	0.116	0.001	0.094	0.014	2.412	0.811	0.03	0.29	0.09	0.63
LAKESHORE	MH3157006440	1	MH3164206465	0.300	0.450	76.70	0.20	0.043	0.127	0.001	0.094	0.013	2.188	0.741	0.03	0.29	0.11	0.65
LAKESHORE	MH3164206465	1	MH3170706488	0.300	0.450	69.10	0.18	0.041	0.121	0.001	0.094	0.015	2.296	0.778	0.03	0.27	0.09	0.61
LAKESHORE	MH3170706488	1	MH3175206501	0.300	0.450	46.50	0.22	0.046	0.134	0.001	0.094	0.014	2.047	0.703	0.03	0.29	0.11	0.63
LAKESHORE	MH3175206501	1	MH3186206526	0.300	0.450	113.00	0.22	0.045	0.132	0.001	0.094	0.016	2.094	0.714	0.03	0.28	0.09	0.62
LAKESHORE	MH3186206526	1	MH3195006587	0.300	0.450	107.30	0.20	0.043	0.128	0.001	0.094	0.018	2.193	0.737	0.03	0.30	0.10	0.66
LAKESHORE	MH3195006587	1	MH3202606639	0.300	0.450	91.30	0.15	0.037	0.110	0.001	0.094	0.022	2.549	0.858	0.04	0.29	0.12	0.64
LAKESHORE	MH3202606639	1	MH3210706728	0.300	0.450	120.40	0.20	0.043	0.128	0.001	0.094	0.019	2.194	0.737	0.07	0.31	0.23	0.68
LAKESHORE	MH3210706728	1	MH3214406762	0.300	0.450	50.40	0.20	0.044	0.128	0.001	0.094	0.018	2.144	0.737	0.17	0.33	0.57	0.73
LAKESHORE	MH3214406762	1	MH3214406765	0.375	0.450	3.10	0.67	0.143	0.233	0.001	0.094	0.006	0.660	0.405	0.19	0.34	0.51	0.76
PALACE PIER	MH-A2	1	MH3225206851	0.375	0.000	95.00	0.01	0.015	-	0.007	0.007	0.475	0.475	-	0.07	0.07	0.20	0.20
PALACE PIER	MH3225206851	1	MH3221506814	0.375	0.000	28.90	0.27	0.092	-	0.007	0.007	0.080	0.080	-	0.06	0.06	0.17	0.17
PALACE PIER	MH3221506814	1	MH3216306785	0.375	0.000	54.40	0.40	0.111	-	0.007	0.007	0.066	0.066	-	0.06	0.06	0.17	0.17
GARDINER	MH3216306785	1	MH3217306776	0.675	0.000	17.00	0.92	0.807	-	0.120	0.267	0.149	0.330	-	0.28	0.44	0.42	0.65
GARDINER	MH3217306776	1	MH3223606714	0.675	0.000	70.30	0.16	0.333	-	0.120	0.267	0.362	0.800	-	0.27	0.40	0.39	0.60
GARDINER	MH3223606714	1	MH3222206653	0.675	0.000	50.80	0.16	0.334	-	0.121	0.267	0.361	0.798	-	0.22	0.33	0.32	0.48
GARDINER	MH3222206653	1	MH3224006653	0.675	0.000	9.70	0.62	0.662	-	0.121	0.267	0.182	0.403	-	0.20	0.30	0.29	0.44

*The location identified is a flat pipe in the middle of the system. The d/D ratio and hydraulic gradient shows that there is not a surcharge condition for this pipe and therefore there is no issue.

Appendix H

Flow Monitoring Report

ARU20-0001 Report

ARU20-0001 - 2150 Lakeshore Blvd Flow Monitoring

Monitoring Period: Oct 18, 2020 – Jan 11, 2021

Report completed on: Feb 23, 2021

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Water Management Solutions
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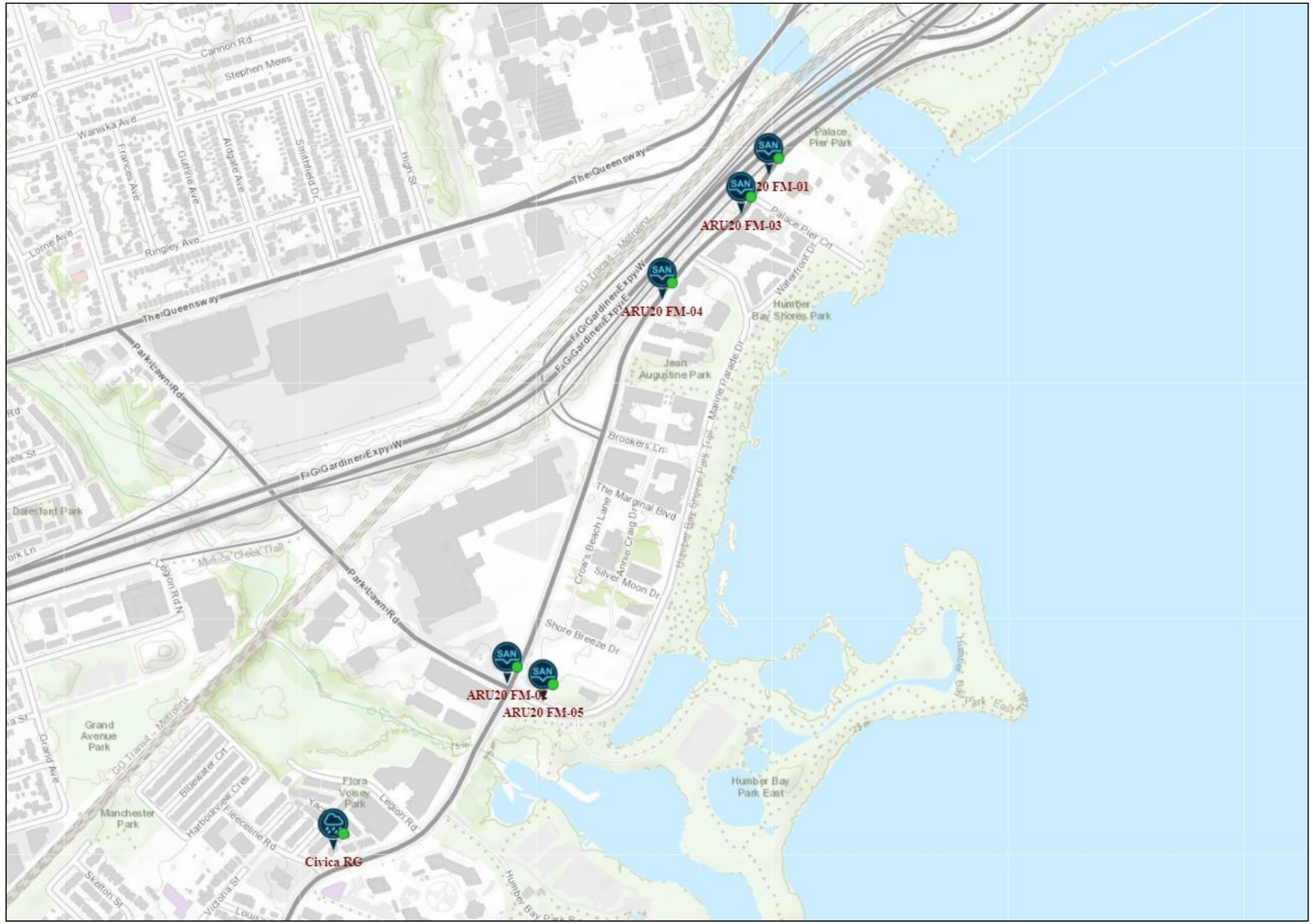
Activity Log Station: ARU20 FM-05 50

Flow Monitoring locations

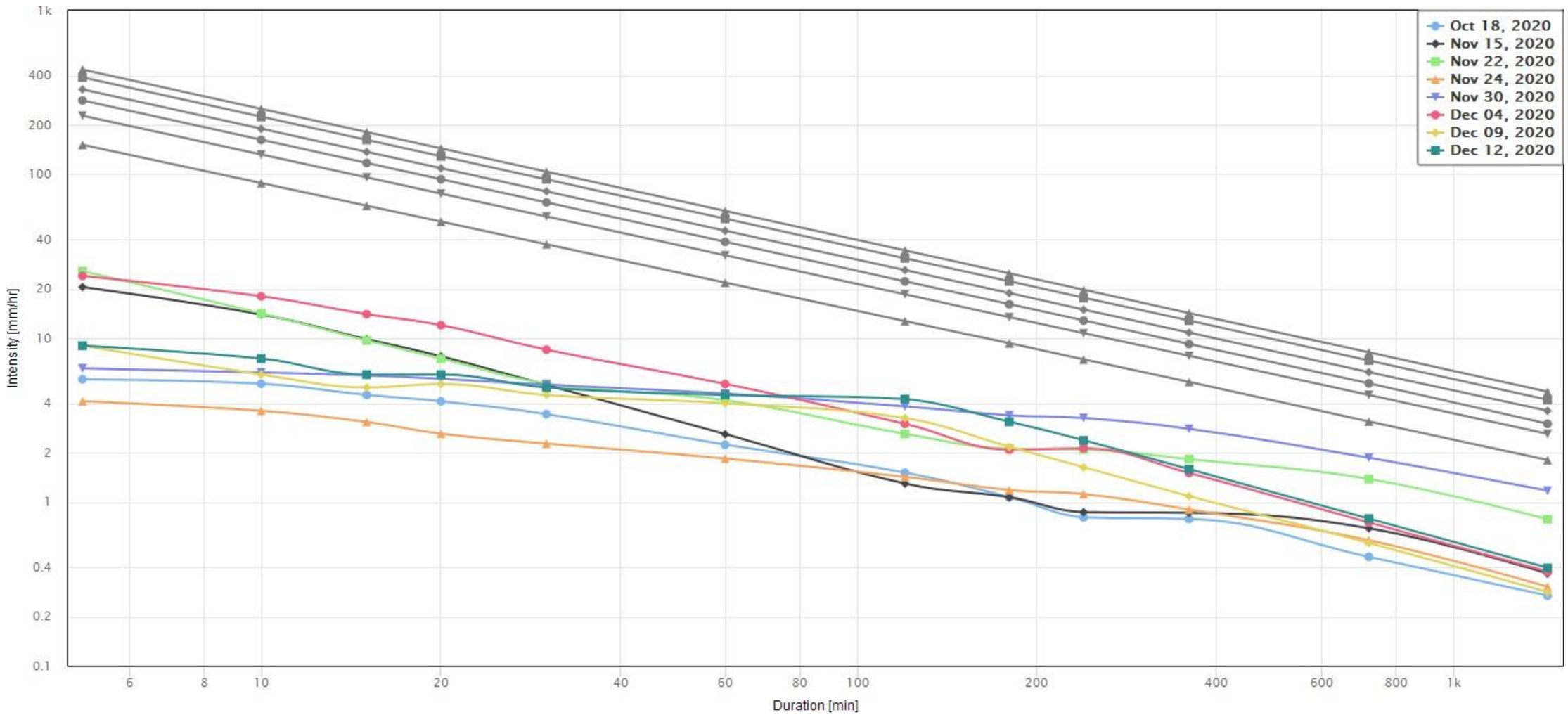


Monitoring Station List

Station Name	Station Type	Station State	Latitude	Longitude	Start Date	End Date	Station Pipe Diameter (mm)	Station Area (ha)	Station Population	Station Tc (min)	Avg Dry Weather Flow (L/s)
ARU20 FM-01[1]	Sanitary Flow	Receiving	43.631586	-79.47518	Oct 18, 2020	Dec 06, 2020	350	2.25	777	5	3.85
ARU20 FM-02	Sanitary Flow	Receiving	43.622998	-79.481273	Oct 18, 2020	Jan 11, 2021	450	5.75	5897	5	8.31
ARU20 FM-03	Sanitary Flow	Receiving	43.630924	-79.47584	Oct 20, 2020	Jan 11, 2021	600	22.63	15629	5	64.35
ARU20 FM-04[2]	Sanitary Flow	Receiving	43.629484	-79.477666	Oct 18, 2020	Jan 11, 2021	300	2.67	0	5	0.45
ARU20 FM-05	Sanitary Flow	Receiving	43.622707	-79.480441	Oct 18, 2020	Jan 11, 2021	550	6.39	6078	5	11.74

[1] *Due to equipment issues, data collection for FM-01 was limited to December 6th*

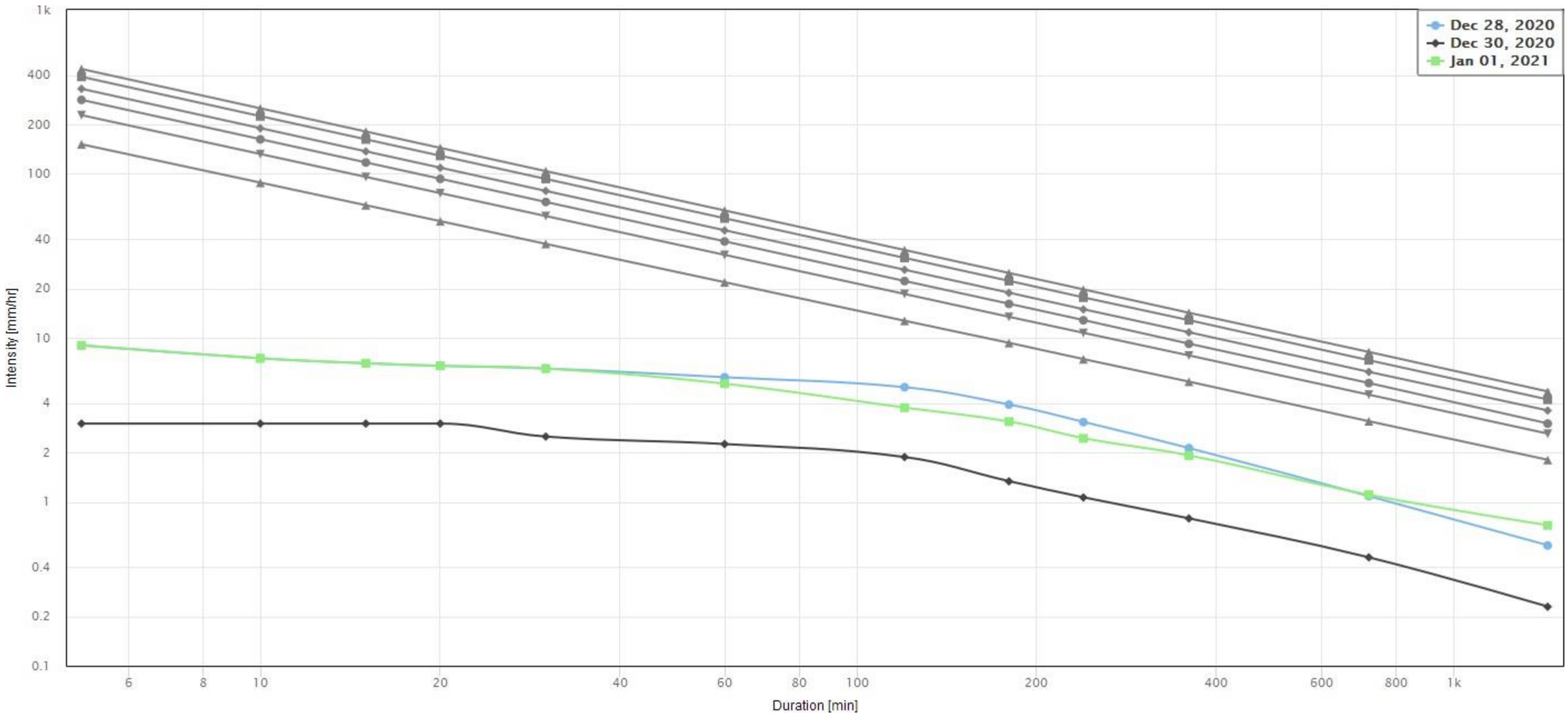
IDF Return Period Analysis



[1] Total of eleven (11) events greater than 5 mm were captured during the flow monitoring period. The rainfall events were evaluated against Environment Canada's Intensity Duration Frequency (IDF) criteria for Toronto Wastewater Treatment Plant (2019) to determine the statistical significance of each storm analyzed over the relevant time intervals.

[2] Civica Rain Gauge was installed December 4th, 2020.

[3] Data from the City of Toronto Rain Gauge was used to supplement rainfall data for October 2020 – December 4th, 2020. Upon review of data, some inconsistencies were found, and data was used with caution.



[1] Total of eleven (11) events greater than 5 mm were captured during the flow monitoring period. The rainfall events were evaluated against Environment Canada's Intensity Duration Frequency (IDF) criteria for Toronto Wastewater Treatment Plant (2019) to determine the statistical significance of each storm analyzed over the relevant time intervals.

[2] Civica Rain Gauge was installed December 4th, 2020.

[3] Data from the City of Toronto Rain Gauge was used to supplement rainfall data for October 2020 – December 4th, 2020. Upon review of data, some inconsistencies were found, and data was used with caution.

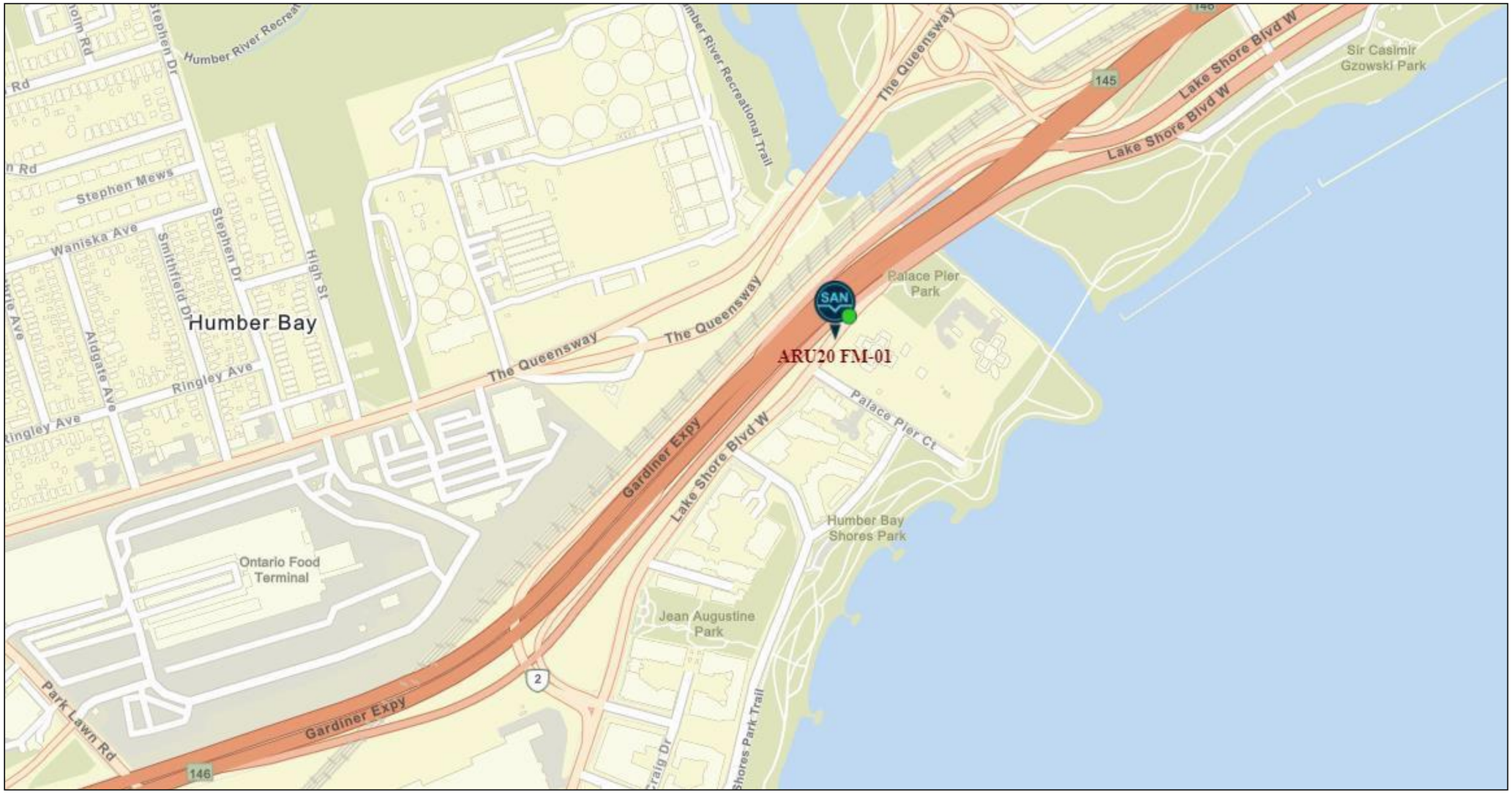
Table 1: Toronto Wastewater Treatment Plant (2019) IDF Design Storm

Event	Duration (hrs)	Return Period Over Tc	Total Precipitation (mm)	IDF Expected Peak Intensity at Timestep (mm/hr)											
				5 min	10 min	15 min	20 min	30 min	60 min	120 min	180 min	240 min	360 min	720 min	1440 min
2 Year Storm	-	-	-	151.40	88.20	64.30	51.40	37.40	21.80	12.70	9.30	7.40	5.40	3.10	1.80
5 Year Storm	-	-	-	227.90	131.80	95.70	76.20	55.30	32.00	18.50	13.40	10.70	7.80	4.50	2.60
10 Year Storm	-	-	-	282.50	162.30	117.30	93.20	67.40	38.70	22.20	16.10	12.80	9.20	5.30	3.00
25 Year Storm	-	-	-	330.00	189.50	137.00	108.90	78.70	45.20	26.00	18.80	14.90	10.80	6.20	3.60
50 Year Storm	-	-	-	390.60	224.30	162.20	128.80	93.10	53.50	30.70	22.20	17.60	12.80	7.30	4.20
100 Year Storm	-	-	-	435.80	250.30	181.00	143.80	103.90	59.70	34.30	24.80	19.70	14.20	8.20	4.70

Table 2: IDF Return Period Results

Event	Duration (hrs)	Return Period Over Tc	Total Precipitation (mm)	Recorded Peak Intensity at Timestep (mm/hr)											
				5 min	10 min	15 min	20 min	30 min	60 min	120 min	180 min	240 min	360 min	720 min	1440 min
Oct 18, 2020	31.00	< 2- Year	8.54	5.61	5.27	4.50	4.12	3.44	2.24	1.51	1.07	0.81	0.79	0.46	0.27
Nov 15, 2020	22.00	< 2- Year	8.76	20.51	13.92	9.85	7.74	5.18	2.59	1.30	1.07	0.87	0.86	0.69	0.37
Nov 22, 2020	25.00	< 2- Year	19.52	25.62	14.14	9.68	7.50	5.29	4.18	2.61	2.12	2.09	1.82	1.38	0.78
Nov 24, 2020	38.00	< 2- Year	8.53	4.12	3.60	3.08	2.61	2.27	1.84	1.42	1.18	1.12	0.90	0.58	0.30
Nov 30, 2020	45.00	< 2- Year	30.79	6.54	6.18	5.92	5.65	5.19	4.59	3.83	3.38	3.25	2.79	1.86	1.17
Dec 04, 2020	7.00	< 2- Year	9.42	24.00	18.00	14.00	12.00	8.50	5.25	3.00	2.08	2.13	1.50	0.75	0.38
Dec 09, 2020	8.00	< 2- Year	6.75	9.00	6.00	5.00	5.25	4.50	4.00	3.25	2.17	1.63	1.08	0.56	0.28
Dec 12, 2020	4.00	< 2- Year	9.50	9.00	7.50	6.00	6.00	5.00	4.50	4.25	3.08	2.38	1.58	0.79	0.40
Dec 28, 2020	6.00	< 2- Year	13.00	9.00	7.50	7.00	6.75	6.50	5.75	5.00	3.92	3.06	2.13	1.08	0.54
Dec 30, 2020	7.00	< 2- Year	5.50	3.00	3.00	3.00	3.00	2.50	2.25	1.88	1.33	1.06	0.79	0.46	0.23
Jan 01, 2021	22.00	< 2- Year	17.25	9.00	7.50	7.00	6.75	6.50	5.25	3.75	3.08	2.44	1.92	1.10	0.72

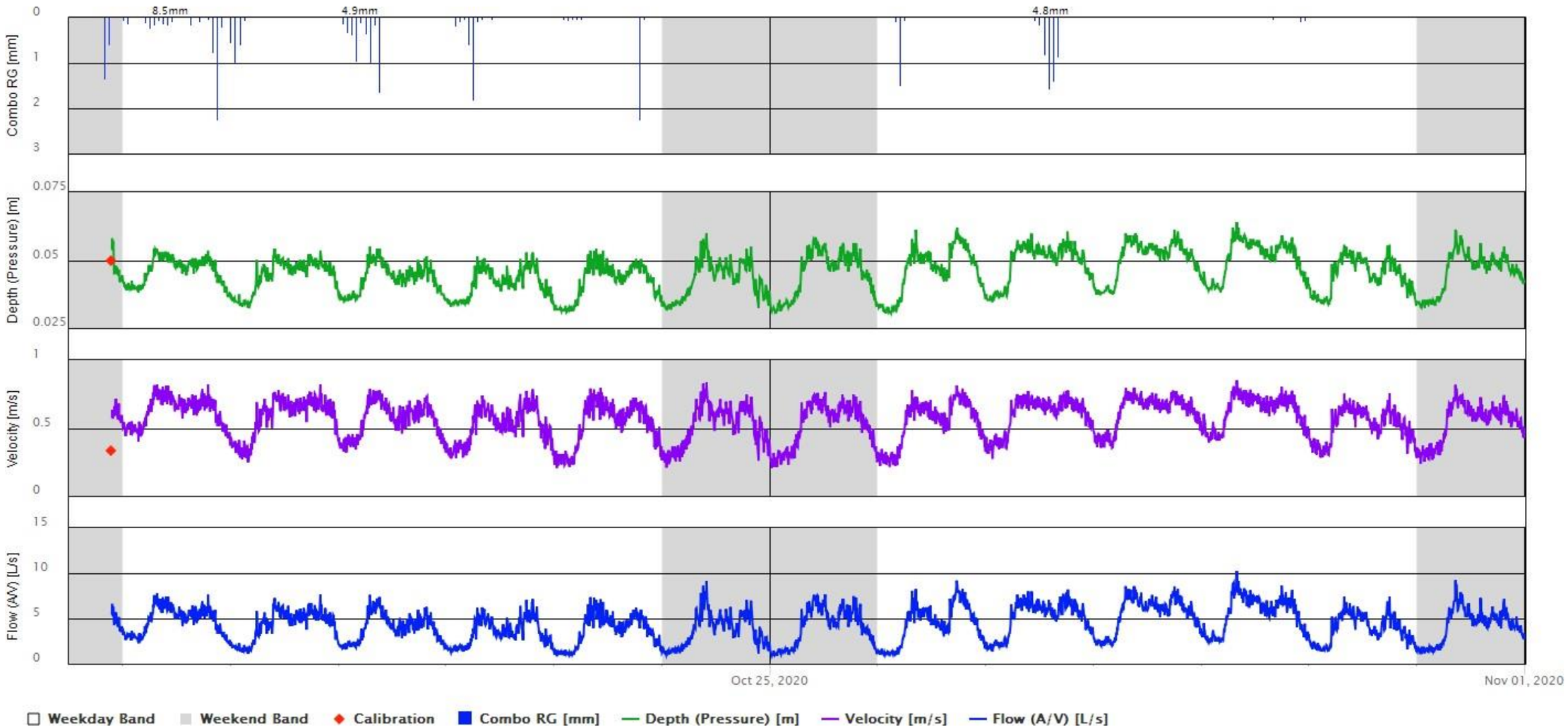
Station: ARU20 FM-01



Data Chart

Station: ARU20 FM-01

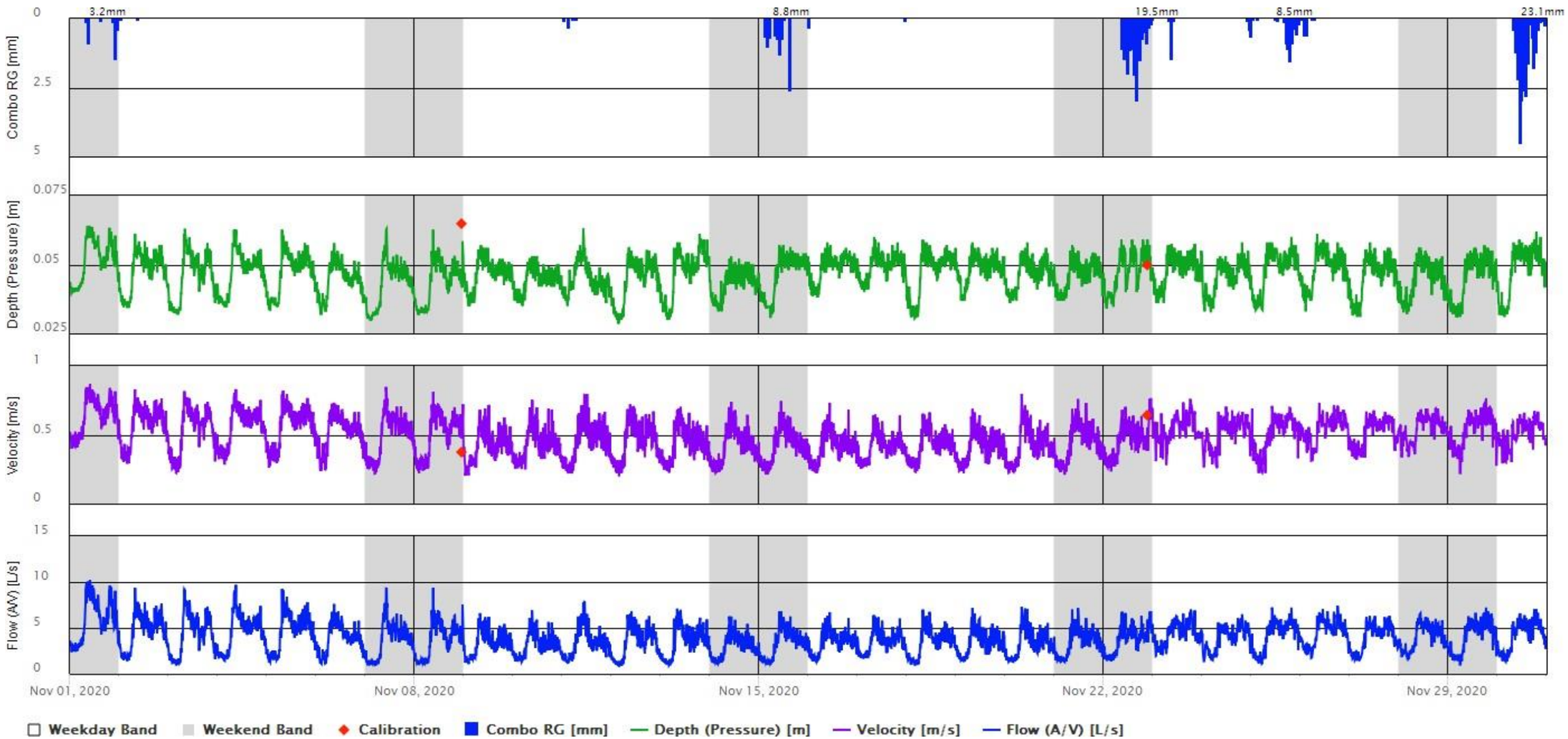
Oct 18, 2020 – Oct 31, 2020



Data Chart

Station: ARU20 FM-01

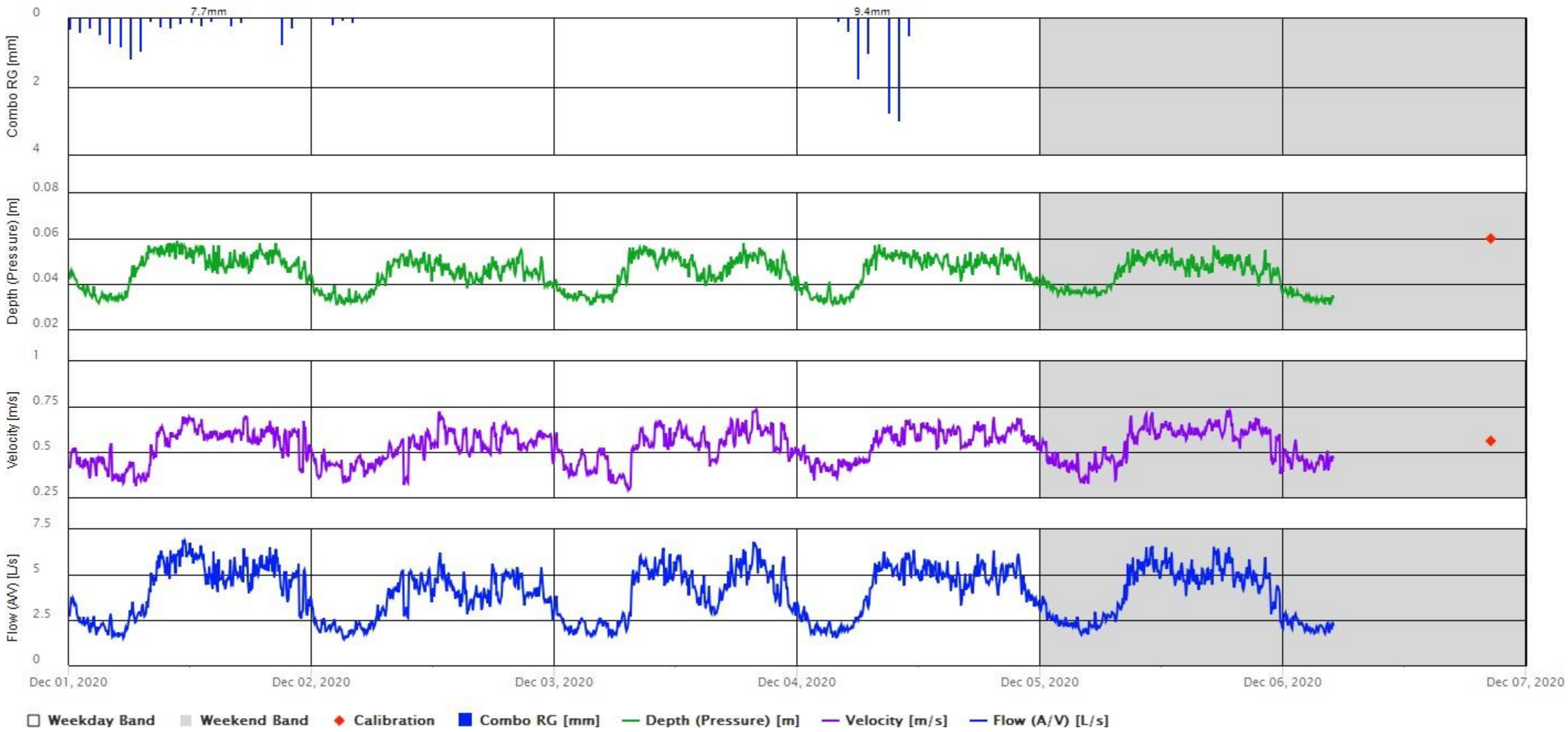
Nov 01, 2020 – Nov 30, 2020



Data Chart

Station: ARU20 FM-01

Dec 01, 2020 – Dec 06, 2020



Due to equipment issues, data collection for FM-01 was limited to December 6th

Aggregate Data

Station: ARU20 FM-01

Level

Date From	Date To	Days	Min (m)	Avg (m)	Max (m)	Count	Time of Min[1]	Time of Max[1]
Oct 18, 2020	Dec 06, 2020	50	0.03	0.05	0.08	13,915	Wed Nov 18, 2020 03:55	Sun Nov 01, 2020 09:45

Velocity

Date From	Date To	Days	Min (m/s)	Avg (m/s)	Max (m/s)	Count	Time of Min[1]	Time of Max[1]
Oct 18, 2020	Dec 06, 2020	50	0.20	0.48	0.80	13,915	Thu Nov 12, 2020 03:45	Fri Nov 20, 2020 08:05

Flow

Date From	Date To	Days	Min (L/s)	Avg (L/s)	Max (L/s)	Total Volume (1,000,000 L)	Count	Time of Min[1]	Time of Max[1]
Oct 18, 2020	Dec 06, 2020	50	0.90	4.35	13.03	18.15	13,915	Sun Oct 25, 2020 01:20	Sun Nov 01, 2020 09:45

Precipitation

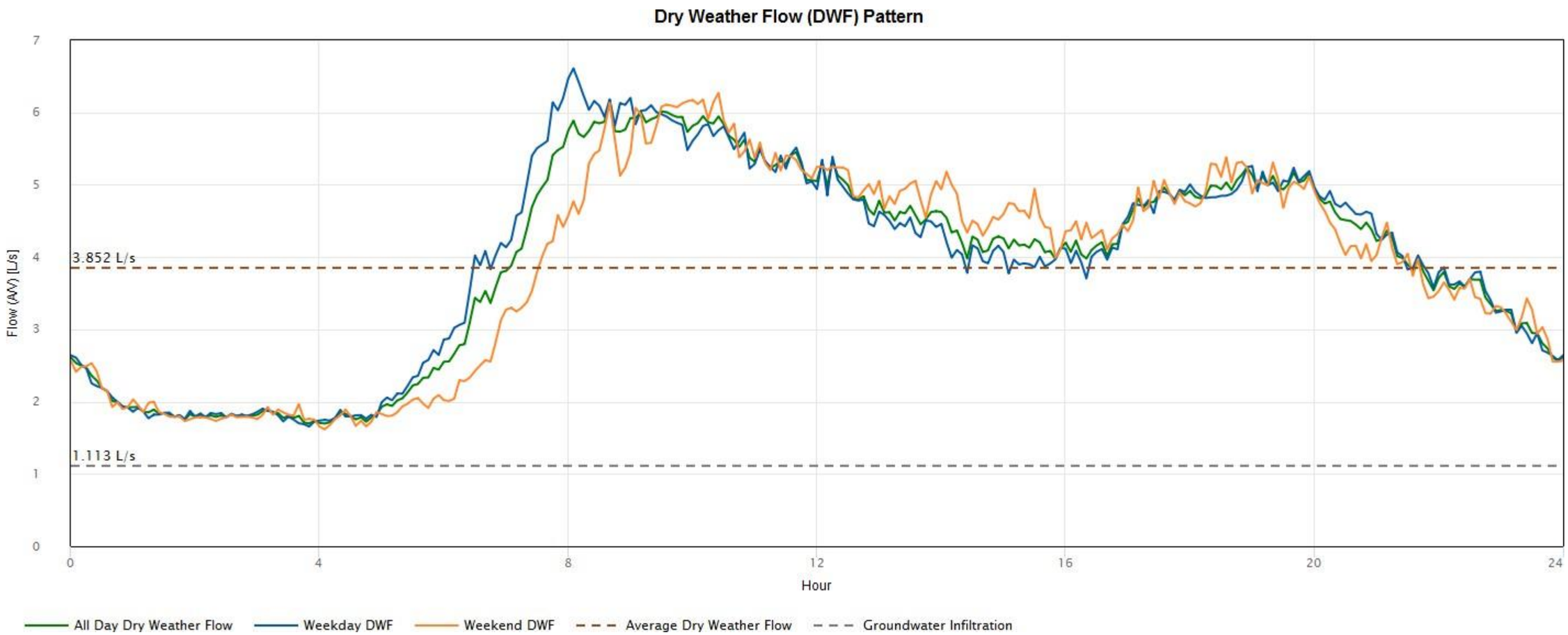
Date From	Date To	Days	Min (mm)	Avg (mm)	Max (mm)	Sum (mm)	Count	Time of Min[1]	Time of Max[1]
Oct 18, 2020	Dec 06, 2020	50	0.00	0.01	2.00	70.50	11,780	Fri Dec 04, 2020 07:00	Fri Dec 04, 2020 09:55

[1] Time of Min and Time of Max will be displayed by first occurrence

Sanitary Report

Station: ARU20 FM-01

Average Dry Weather Flow (L/s)	Average Dry Weather Flow (L/c/d)	Average Daily Minimum Dry Weather Flow (L/s)	Average Daily Peak Dry Weather Flow (L/s)
3.852	428.311	1.309	7.546
Peaking Factor	**Groundwater Infiltration (L/s)[1]**	**Groundwater Infiltration (L/ha/d)**	**% of GWI in Average DWF**
1.959	1.113	42,729.012	28.888



[1] Industry Standard Groundwater infiltration (GWI) is assumed as 85% of the daily minimum flow averaged over the monitoring period

I/I Analysis Table

Station: ARU20 FM-01

Measured Storms	Event[1]	Total Precipitation (mm)	Duration (hours)	Peak Intensity Over Tc at Station (mm/hr)	Flow KPIs	ARU20 FM-01				
						Time of Peak I/I Flow (TD) (date)	Peak Depth (mm)	Peak I/I Flow (L/s)	Measured Peak Flow (L/s)	Estimated Dry Weather Flow at TD (L/s)
	Oct 18, 2020	8.54	31.92	5.60		Oct 19, 2020 07:00	58.00	4.17	7.77	3.41
	Nov 15, 2020	8.76	22.00	20.50		Nov 15, 2020 15:20	58.00	2.03	6.82	4.21
	Nov 22, 2020	19.52	25.33	25.60		Nov 22, 2020 23:05	59.00	3.61	6.99	3.22
	Nov 24, 2020	8.53	38.17	4.10		Nov 26, 2020 16:25	61.00	2.74	7.42	4.01
	Nov 30, 2020	30.79	45.08	6.50		Dec 01, 2020 14:15	62.00	2.59	7.04	3.70
	Dec 04, 2020	9.00	4.83	24.00		Dec 04, 2020 21:50	57.50	2.60	6.80	3.56
	Dec 09, 2020	6.75	7.50	9.00		-				
	Dec 12, 2020	9.50	3.25	9.00		-				
	Dec 28, 2020	13.00	6.00	9.00		-				
	Dec 30, 2020	5.50	7.50	3.00		-				
	Jan 01, 2021	17.25	21.92	9.00		-				

[1] An event is a storm with a minimum volume of 5mm and a minimum inter-event dry period of 12 hours
[2] I/I event analysis was limited to December 6th due to equipment issues

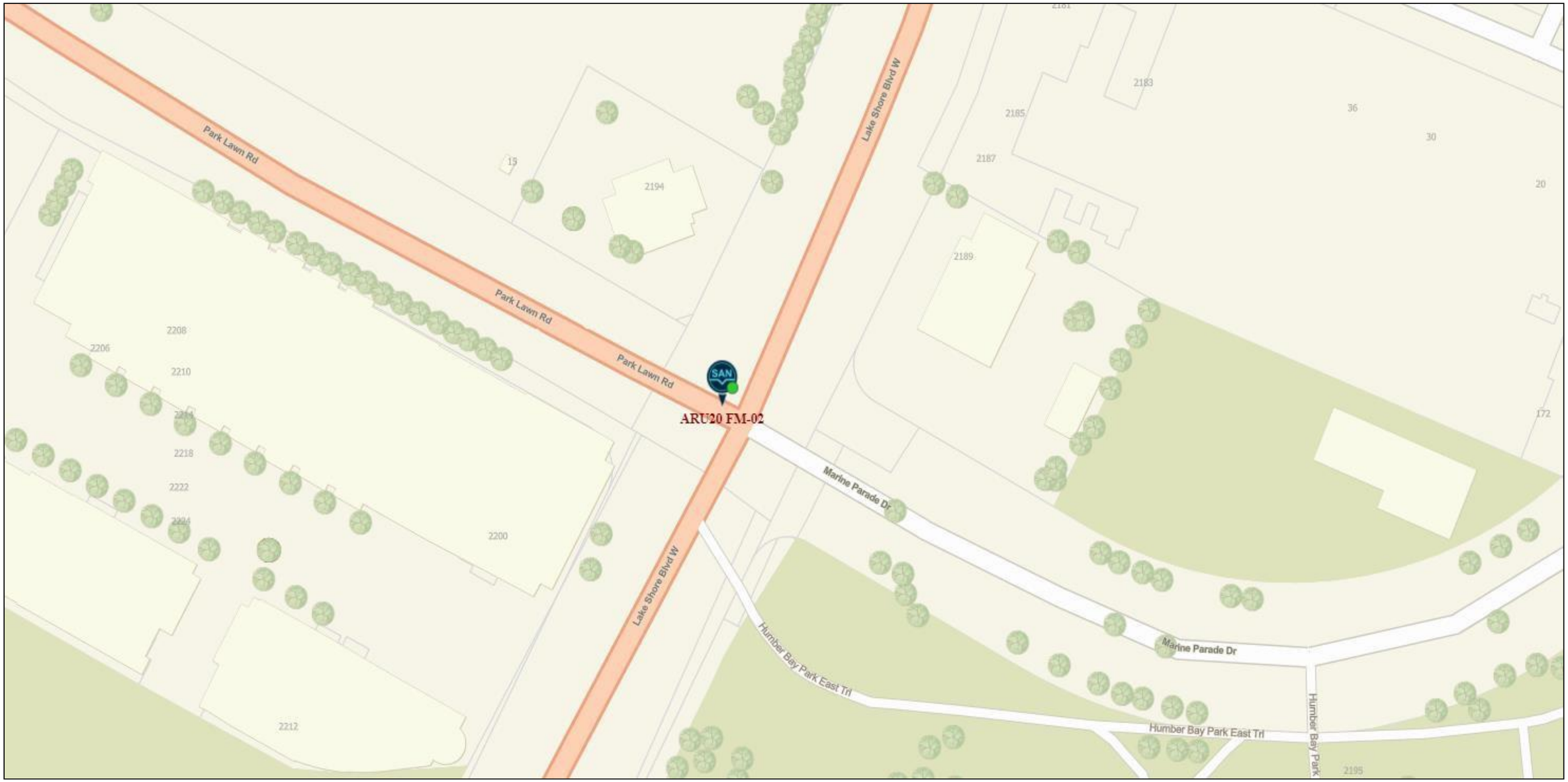
Activity Log

Station: ARU20 FM-01[1]

Date Time	Type	Purpose of Visit	Comment	Calibration Measurement
18-Oct-2020 09:26:00 PM	Installation Log	INSTALLATION OF DETECTRONIC DOWNWARDS SENSOR AND AV RING	LOGGER SN: 20193379616 PMAC ID: 8074 DOWNWARDS SN: 192825009-59	Yes
08-Nov-2020 11:22:00 PM	Maintenance Log	CALIBRATION	SITE CALIBRATED PMAC ID: 8074 SIGNIFICANT DEBRIS CAUSED THE ISSUE OF FLAT LINING DATA DOWNLOADED DEBRIS CLEARED TELEMETRY SENT	Yes
22-Nov-2020 09:50:00 PM	Maintenance Log	CALIBRATION AND DATA DOWNLOAD	Site calibrated Debris cleared Bracket moved up by 100mm (New empty dist: 14340) Sensor moved to 5 o clock position - RESETTED VELOCITY Sent telemetry	Yes
06-Dec-2020 08:36:00 PM	Maintenance Log	CALIBRATION	SITE CALIBRATED DATA DOWNLOADED DEBRIS CLEARED TELEMETRY SENT DOWNWARD WAS READING 14,456 WHEN WE ARRIVED UPDATED EMPTY DISTANCE TO 490 mm IT WAS 660 mm NOTICED A LOT OF DEBRIS ON THE BRACKET	Yes

[1]Due to equipment issues, data collection for FM-01 was limited to December 6th

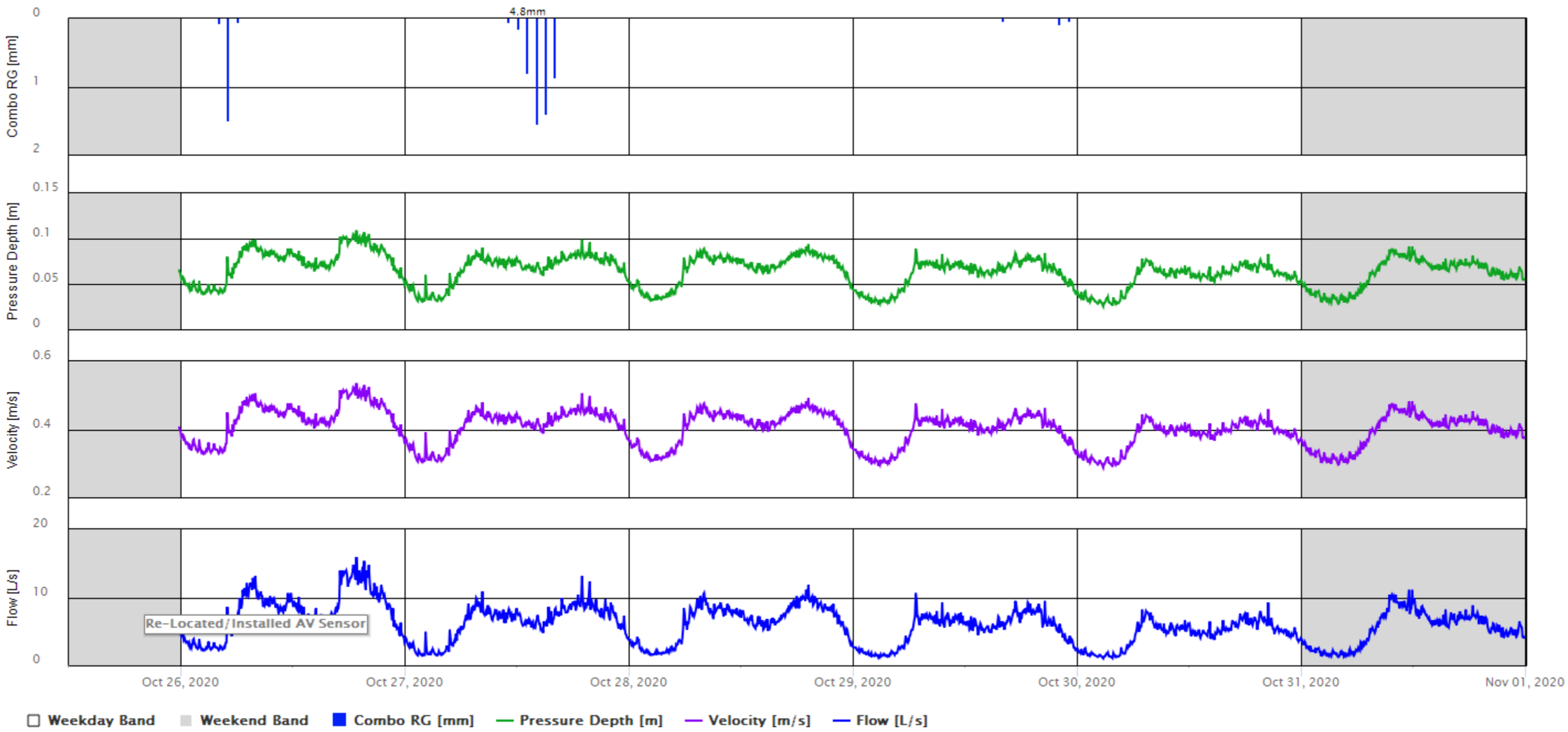
Station: ARU20 FM-02



Data Chart

Station: ARU20 FM-02

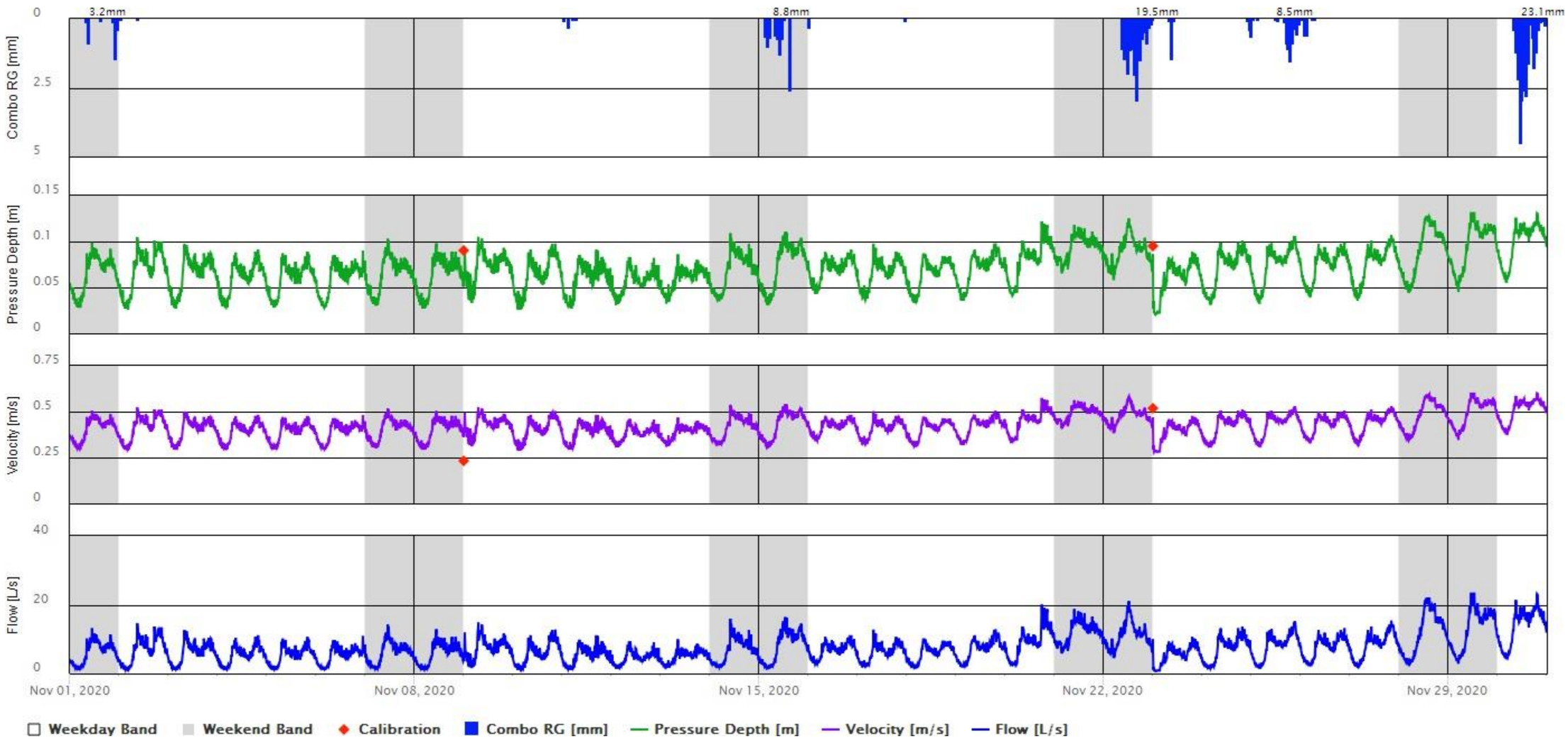
Oct 18, 2020 – Oct 31, 2020



Data Chart

Station: ARU20 FM-02

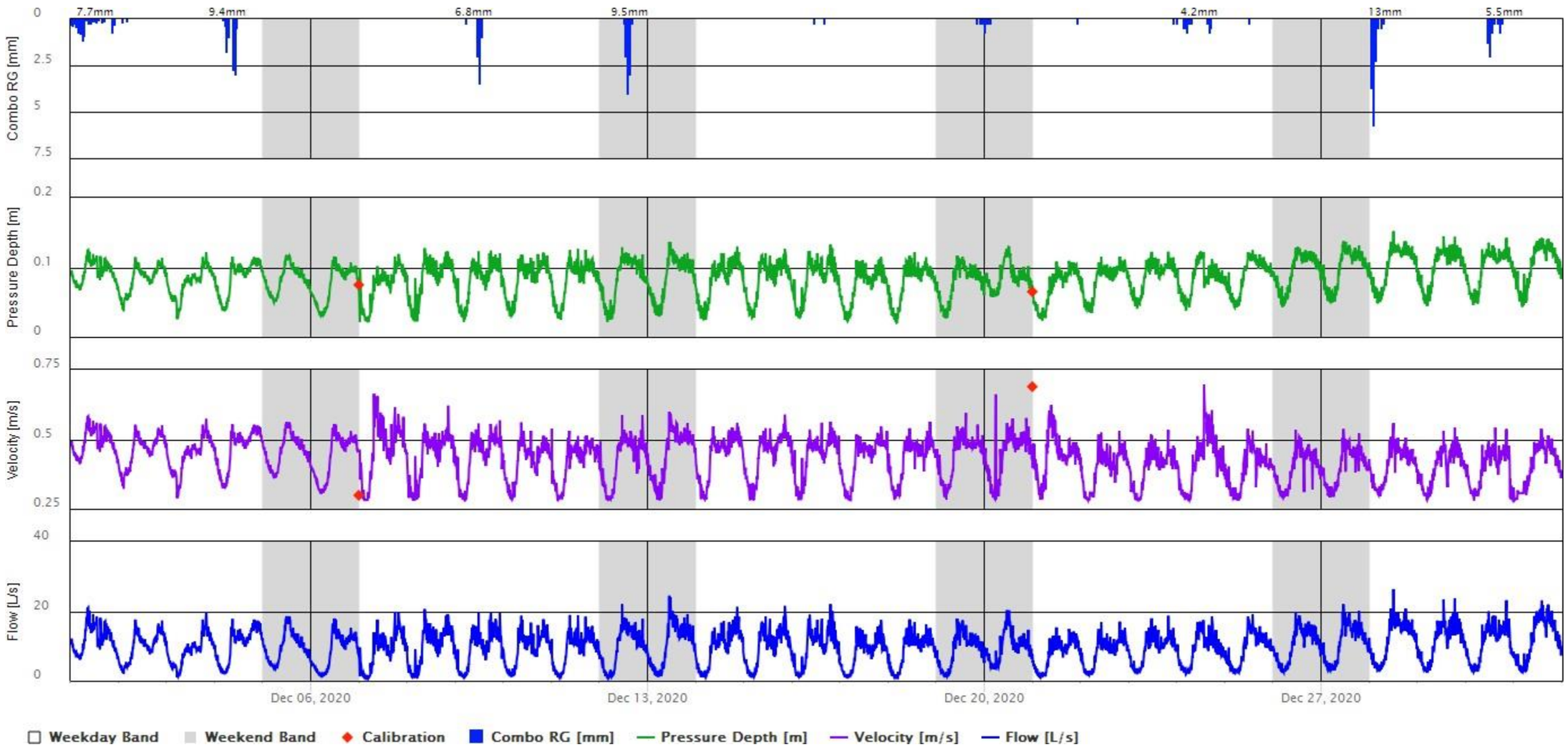
Nov 01, 2020 – Nov 30, 2020



Data Chart

Station: ARU20 FM-02

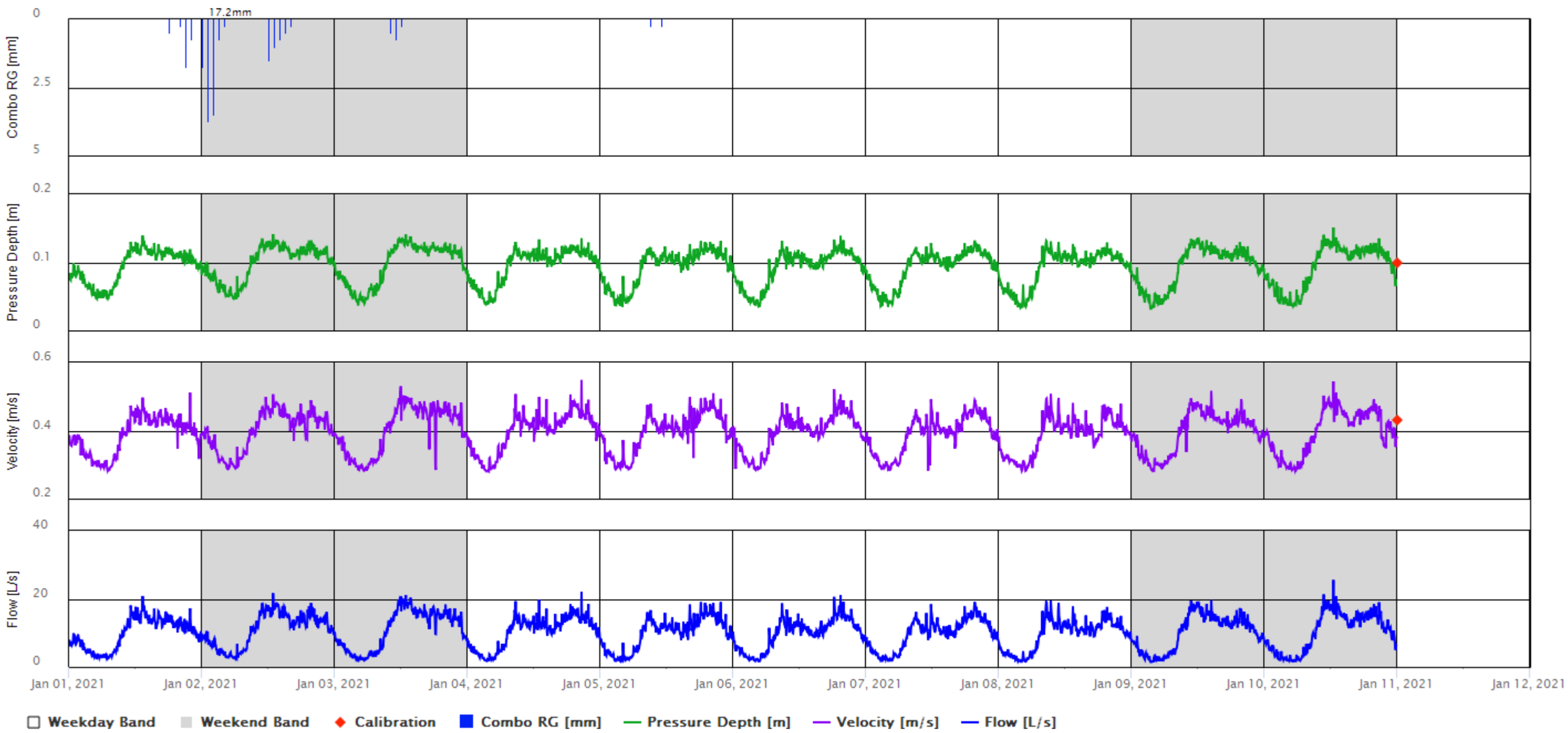
Dec 01, 2020 – Dec 31, 2020



Data Chart

Station: ARU20 FM-02

Jan 01, 2021 – Jan 12, 2021



Aggregate Data

Station: ARU20 FM-02

Level

Date From	Date To	Days	Min (m)	Avg (m)	Max (m)	Count	Time of Min[1]	Time of Max[1]
Oct 18, 2020	Jan 11, 2021	79	0.02	0.08	0.15	22,180	Fri Dec 18, 2020 04:00	Mon Dec 28, 2020 11:50

Velocity

Date From	Date To	Days	Min (m/s)	Avg (m/s)	Max (m/s)	Count	Time of Min[1]	Time of Max[1]
Oct 18, 2020	Jan 11, 2021	79	0.28	0.42	0.70	22,180	Thu Dec 24, 2020 06:00	Thu Dec 24, 2020 13:20

Flow

Date From	Date To	Days	Min (L/s)	Avg (L/s)	Max (L/s)	Total Volume (1,000,000 L)	Count	Time of Min[1]	Time of Max[1]
Oct 18, 2020	Jan 11, 2021	79	0.75	8.56	26.36	56.99	22,180	Mon Dec 07, 2020 04:10	Mon Dec 28, 2020 11:50

Precipitation

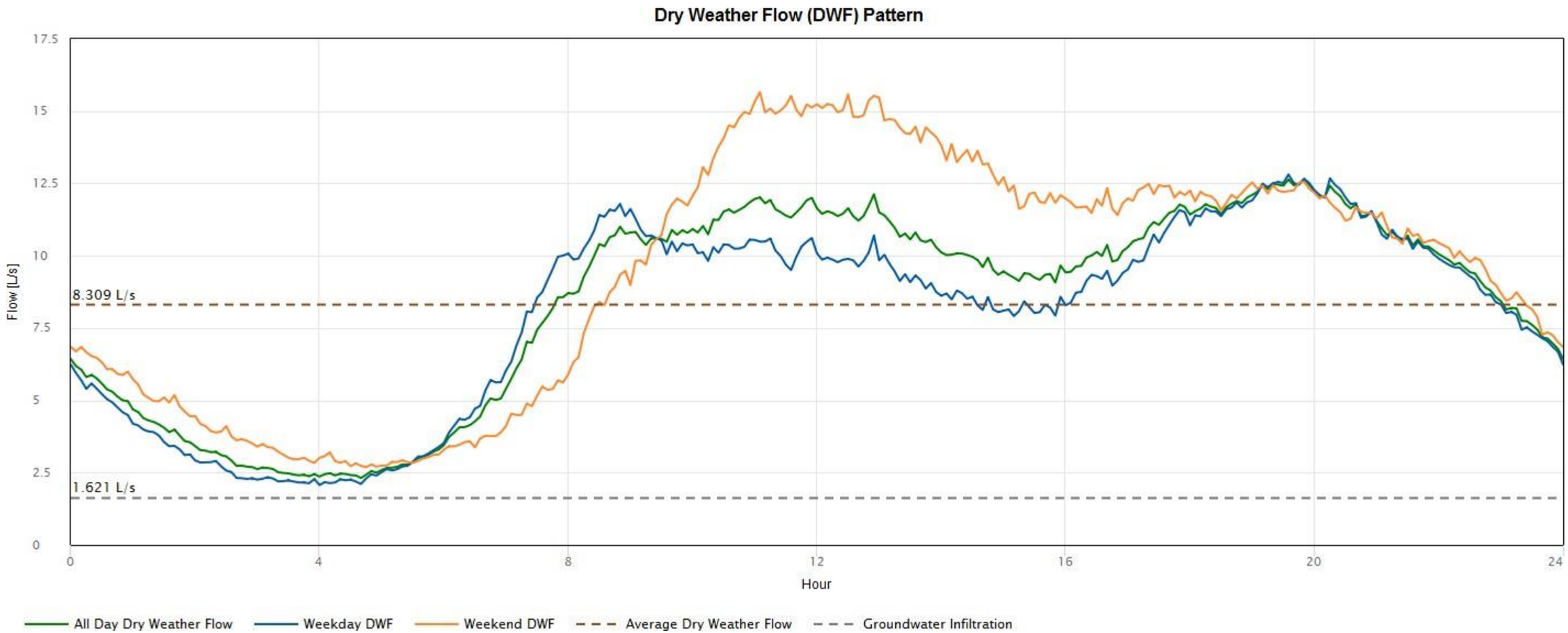
Date From	Date To	Days	Min (mm)	Avg (mm)	Max (mm)	Sum (mm)	Count	Time of Min[1]	Time of Max[1]
Oct 18, 2020	Jan 11, 2021	79	0.00	0.01	2.00	70.50	11,780	Fri Dec 04, 2020 07:00	Fri Dec 04, 2020 09:55

[1] Time of Min and Time of Max will be displayed by first occurrence

Sanitary Report

Station: ARU20 FM-02

Average Dry Weather Flow (L/s)	Average Dry Weather Flow (L/c/d)	Average Daily Minimum Dry Weather Flow (L/s)	Average Daily Peak Dry Weather Flow (L/s)
8.309	121.745	1.907	16.806
Peaking Factor	**Groundwater Infiltration (L/s)[1]**	**Groundwater Infiltration (L/ha/d)**	**% of GWI in Average DWF**
2.023	1.621	24,357.874	19.509



[1] Industry standard Groundwater infiltration (GWI) is assumed as 85% of the daily minimum flow averaged over the monitoring period

I/I Analysis Table

Station: ARU20 FM-02

Measured Storms	Event[1]	Total Precipitation (mm)	Duration (hours)	Peak Intensity Over Tc at Station (mm/hr)	Flow KPIs	ARU20 FM-02				
						Time of Peak I/I Flow (TD) (date)	Peak Depth (mm)	Peak I/I Flow (L/s)	Measured Peak Flow (L/s)	Estimated Dry Weather Flow at TD (L/s)
	Oct 18, 2020	8.54	31.92	5.61		No Data[2]				
	Nov 15, 2020	8.76	22.00	20.50		Nov 15, 2020 20:30	110.50	4.81	16.38	9.69
	Nov 22, 2020	19.52	25.33	25.60		Nov 22, 2020 12:20	125.00	4.61	21.02	16.41
	Nov 24, 2020	8.53	38.17	4.10		Nov 25, 2020 21:20	106.00	5.07	15.06	9.99
	Nov 30, 2020	30.79	45.08	6.50		Nov 30, 2020 19:30	131.00	10.32	23.12	12.63
	Dec 04, 2020	9.00	4.83	24.00		Dec 04, 2020 08:45	121.50	6.33	19.84	11.42
	Dec 09, 2020	6.75	7.50	9.00		Dec 09, 2020 11:30	123.92	9.19	19.56	10.33
	Dec 12, 2020	9.50	3.25	9.00		Dec 12, 2020 21:20	128.76	5.86	22.03	11.89
	Dec 28, 2020	13.00	6.00	9.00		Dec 28, 2020 11:50	151.87	13.19	26.36	13.16
	Dec 30, 2020	5.50	7.50	3.00		Dec 30, 2020 20:10	142.30	8.90	23.16	14.25
	Jan 01, 2021	17.25	21.92	9.00		Jan 02, 2021 22:30	141.26	5.40	21.65	10.71

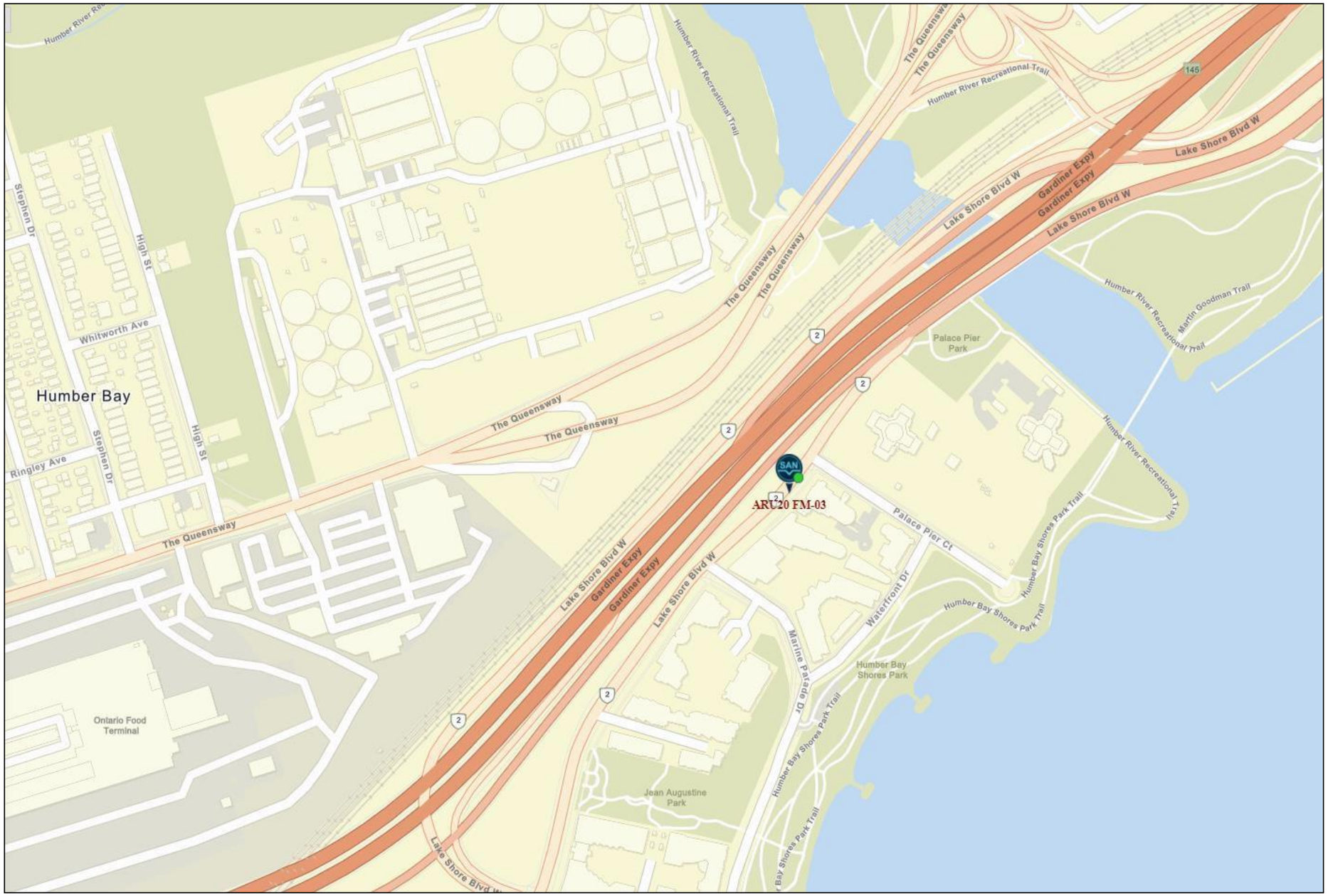
[1] An event is a storm with a minimum volume of 5mm and a minimum inter-event dry period of 12 hours
[2] I/I event analysis unable to be completed due to missing flow monitoring data during event

Activity Log

Station: ARU20 FM-02

Date Time	Type	Purpose of Visit	Comment	Calibration Measurement
19-Oct-2020 12:30:00 AM	Installation Log	INSTALL	DTECT LOGGER INSTALLED AND STARTED. TELEMETRY SENT. MENTIONDED SITE IS DIFFERENT FROM ACTUAL SITE. NO FLOW IN THE INLET, HENCE FLUME INSTALLED. TRIED 2 GENERATORS AND 2 DRILLS, ANTENNA INSTALLDIDN'T WORK	Yes
25-Oct-2020 11:10:00 PM	Installation Log	Installation of AV sensor and logger		Yes
09-Nov-2020 12:18:00 AM	Maintenance Log	CALIBRATION	SITE CALIBRATED DATA DOWNLOADED DEBRIS CLEARED TELEMETRY SENT	Yes
23-Nov-2020 12:15:00 AM	Maintenance Log	CALIBRATION AND DATA DOWNLOAD	Site calibrated Data downloaded Telemetry sent Debris cleared - lot of debris probably why velocity was off - rotated sensor to 5 o clock to eliminate debris issue	Yes
07-Dec-2020 12:00:00 AM	Maintenance Log	CALIBRATION AND LOGGER SWAP	SITE CALIBRATED DATA DOWNLOADED DEBRIS CLEARED TELEMETRY SENT SWAPPED DETEC LOGGER TO AN ADS DETEC SN 2019337 ADS LOGGER SN 63431 SENSOR SN 2879191450 SMART DEPTH SN 2441624246 SMART DEPTH 108.34	Yes
20-Dec-2020 11:59:00 PM	Maintenance Log	CALIBRATION AND DATA DOWNLOAD	DATA DOWNLOADED AND SITE CALIBRATED. TELEMETRY SENT SIM CARD SWAPPED	Yes
11-Jan-2021 12:05:00 AM	Removal Log	REMOVAL	ADS LOGGER REMOVED. DATA DOWNLOADED	Yes

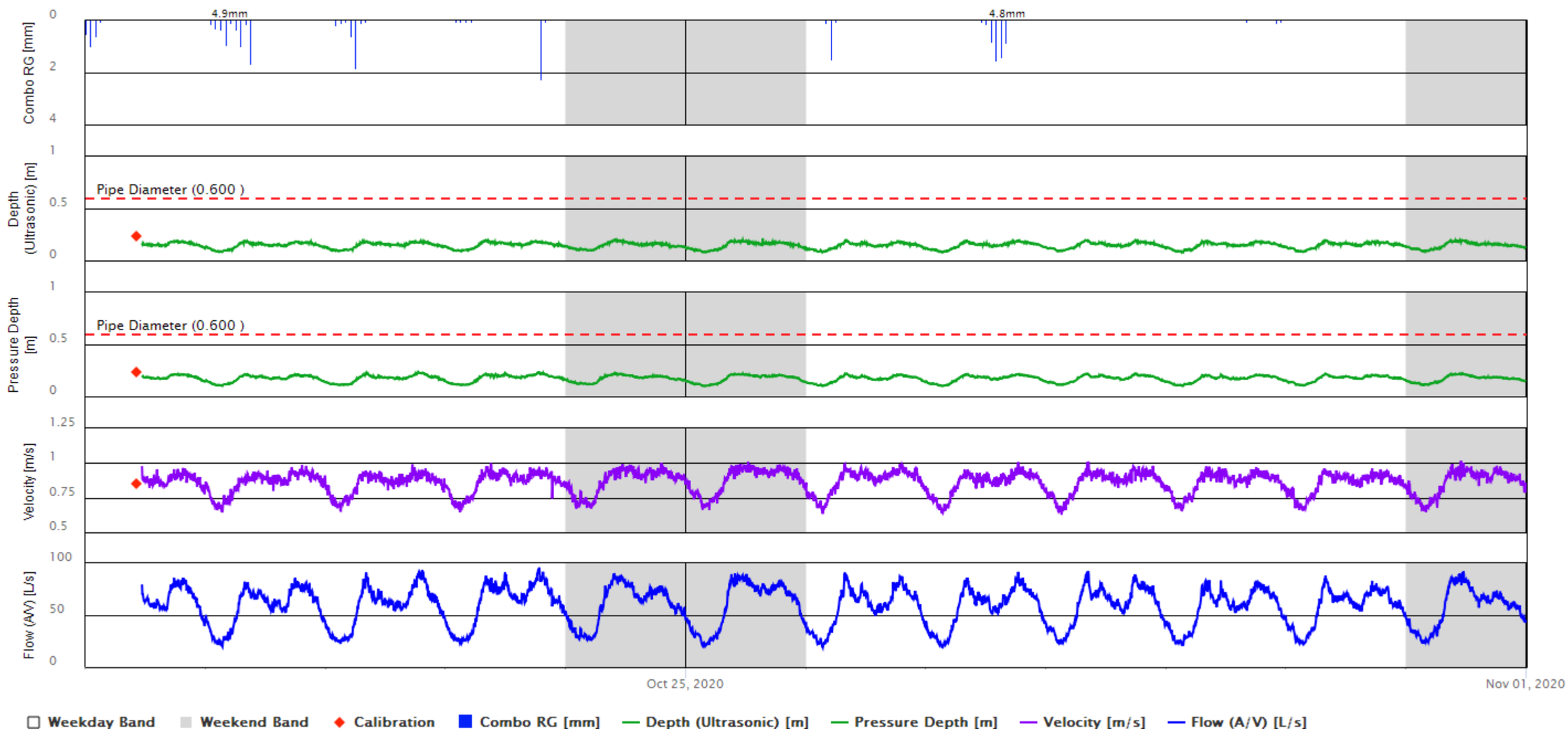
Station: ARU20 FM-03



Data Chart

Station: ARU20 FM-03

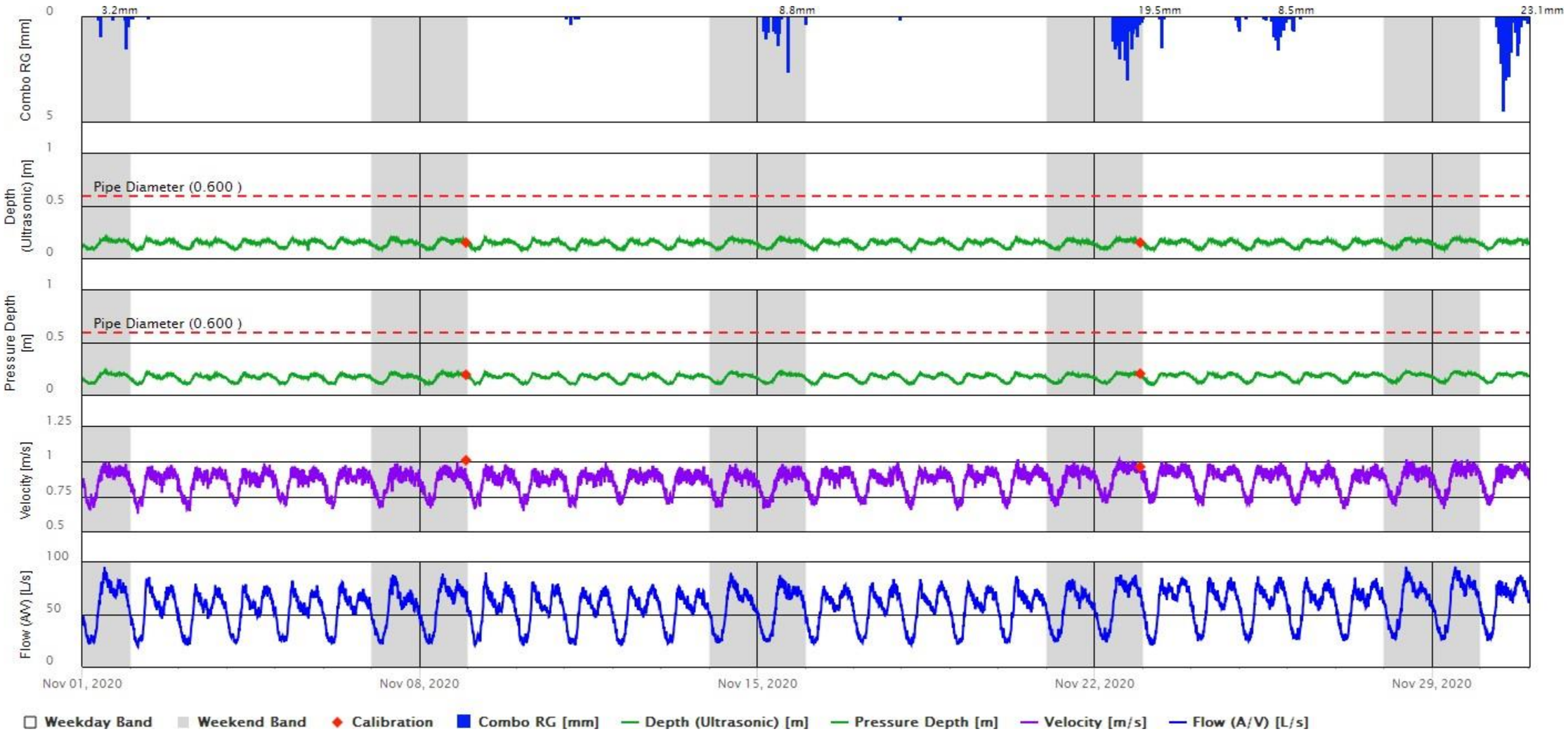
Oct 18, 2020 – Oct 31, 2020



Data Chart

Station: ARU20 FM-03

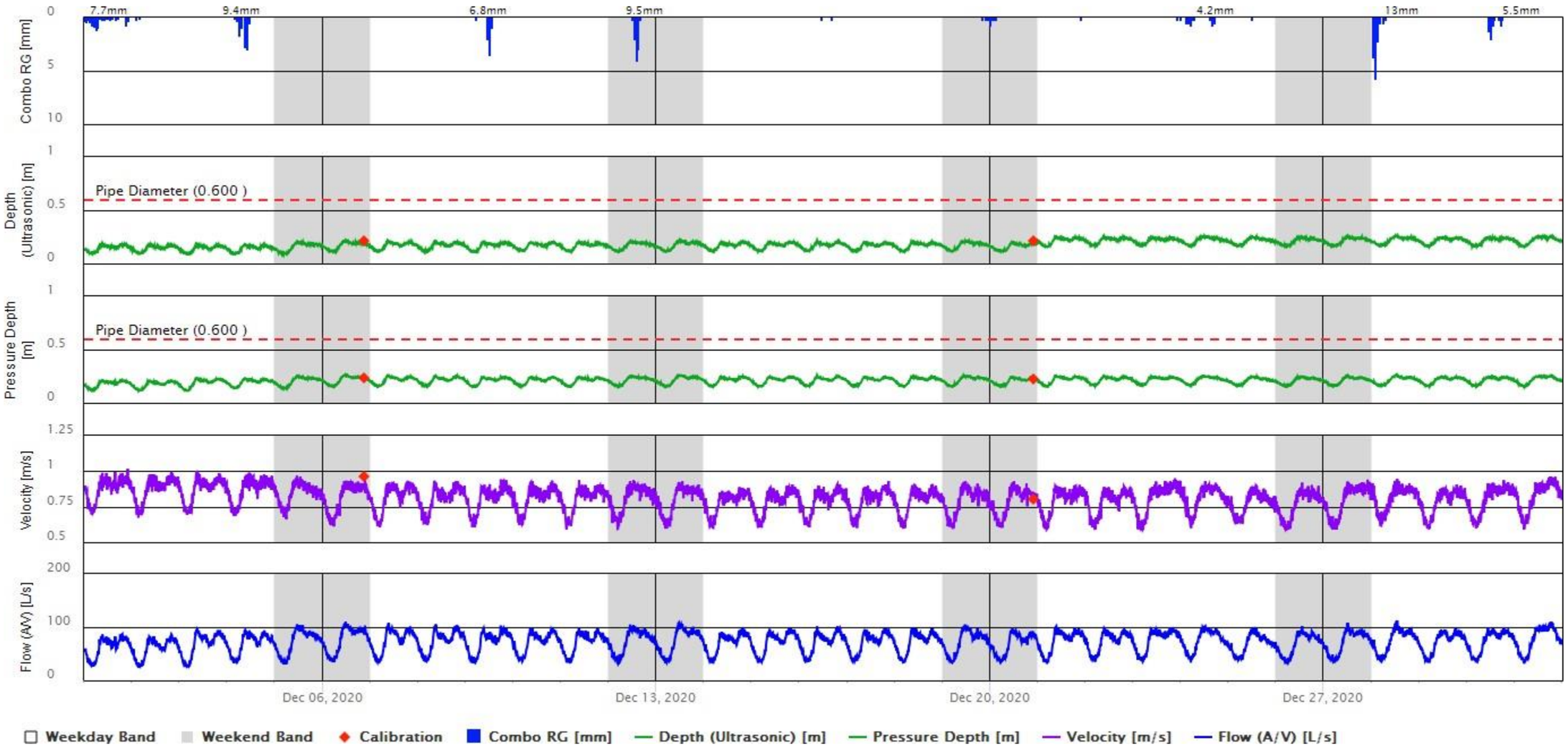
Nov 01, 2020 – Nov 30, 2020



Data Chart

Station: ARU20 FM-03

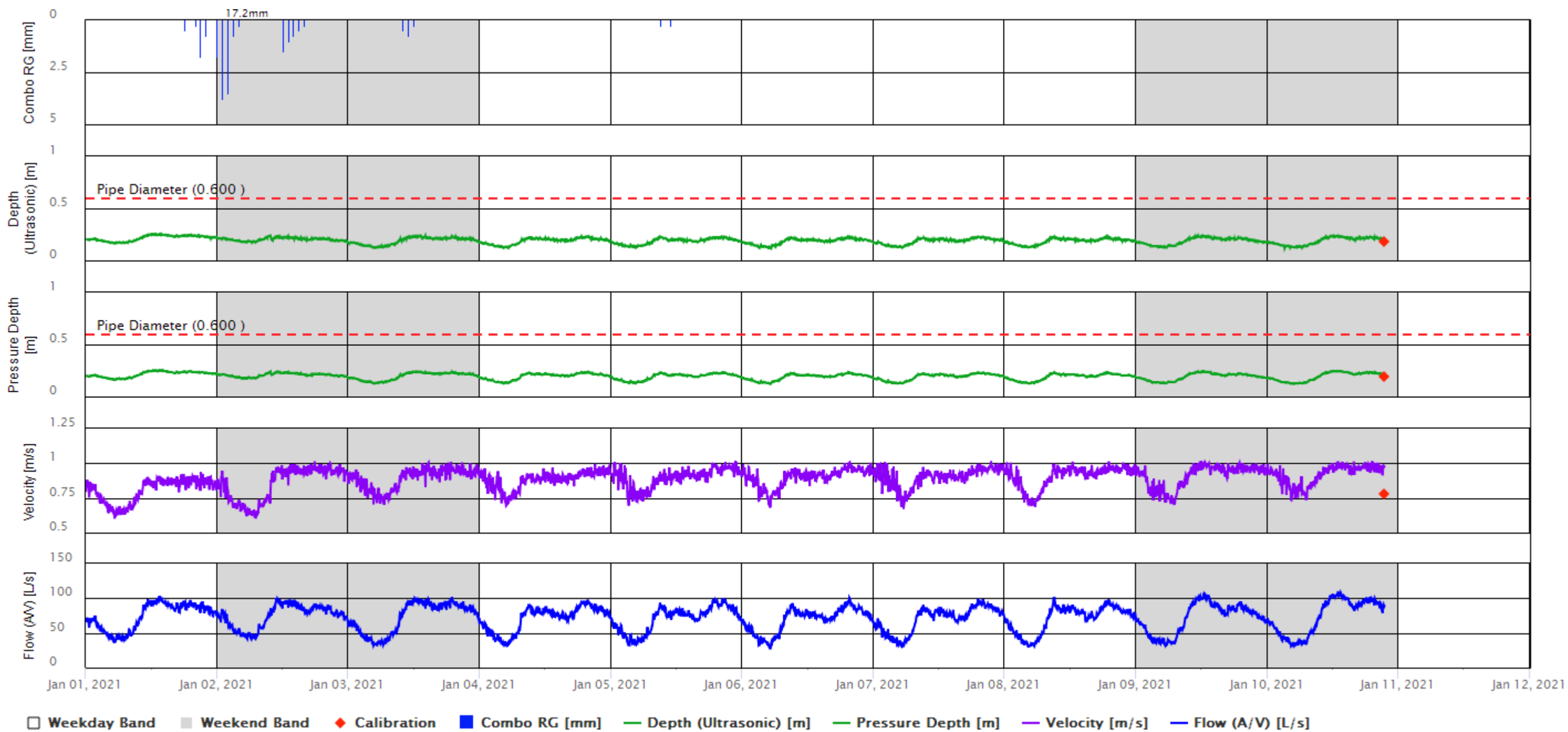
Dec 01, 2020 – Dec 31, 2020



Data Chart

Station: ARU20 FM-03

Jan 01, 2021 – Jan 12, 2021



Aggregate Data

Station: ARU20 FM-03

Level

Date From	Date To	Days	Min (m)	Avg (m)	Max (m)	Count	Time of Min[1]	Time of Max[1]
Oct 18, 2020	Jan 11, 2021	83	0.07	0.16	0.26	23,741	Mon Nov 02, 2020 03:20	Mon Dec 28, 2020 12:05

Velocity

Date From	Date To	Days	Min (m/s)	Avg (m/s)	Max (m/s)	Count	Time of Min[1]	Time of Max[1]
Oct 18, 2020	Jan 11, 2021	83	0.59	0.85	1.02	23,741	Wed Dec 23, 2020 04:55	Fri Nov 20, 2020 09:30

Flow

Date From	Date To	Days	Min (L/s)	Avg (L/s)	Max (L/s)	Total Volume (1,000,000 L)	Count	Time of Min[1]	Time of Max[1]
Oct 18, 2020	Jan 11, 2021	83	18.92	64.81	112.62	461.62	23,741	Mon Oct 26, 2020 03:20	Mon Dec 28, 2020 12:55

Precipitation

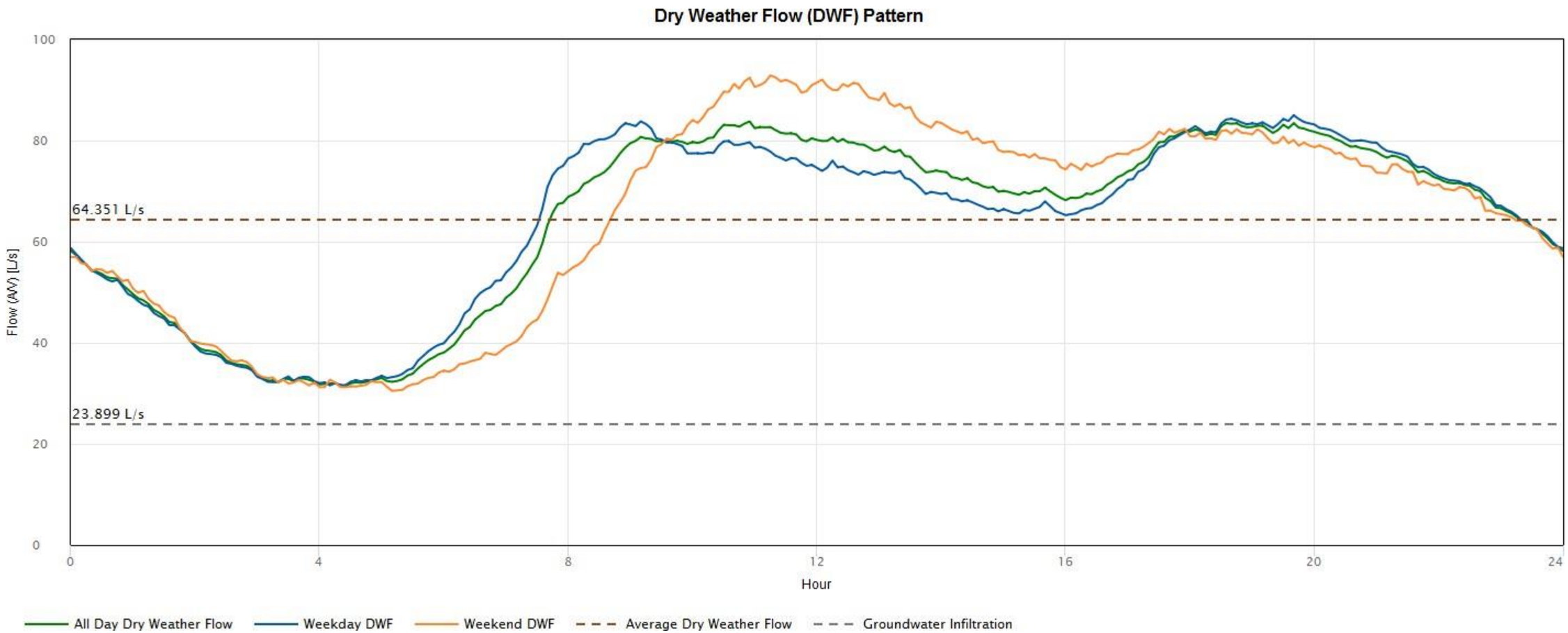
Date From	Date To	Days	Min (mm)	Avg (mm)	Max (mm)	Sum (mm)	Count	Time of Min[1]	Time of Max[1]
Oct 18, 2020	Jan 11, 2021	83	0.00	0.01	2.00	70.50	11,780	Fri Dec 04, 2020 07:00	Fri Dec 04, 2020 09:55

[1] Time of Min and Time of Max will be displayed by first occurrence

Sanitary Report

Station: ARU20 FM-03

Average Dry Weather Flow (L/s)	Average Dry Weather Flow (L/c/d)	Average Daily Minimum Dry Weather Flow (L/s)	Average Daily Peak Dry Weather Flow (L/s)
64.351	355.745	28.116	94.011
Peaking Factor	**Groundwater Infiltration (L/s)[1]**	**Groundwater Infiltration (L/ha/d)**	**% of GWI in Average DWF**
1.461	23.899	91,244.965	37.138



[1] Industry standard Groundwater infiltration (GWI) is assumed as 85% of the daily minimum flow averaged over the monitoring period

I/I Analysis Table

Station: ARU20 FM-03

Measured Storms	Event[1]	Total Precipitation (mm)	Duration (hours)	Peak Intensity Over Tc at Station (mm/hr)	Flow KPIs	ARU20 FM-03				
						Time of Peak I/I Flow (TD) (date)	Peak Depth (mm)	Peak I/I Flow (L/s)	Measured Peak Flow (L/s)	Estimated Dry Weather Flow at TD (L/s)
	Oct 18, 2020	8.54	31.92	5.61		No Data[2]				
	Nov 15, 2020	8.76	22.00	20.50		Nov 15, 2020 15:25	198.00	11.93	87.54	67.30
	Nov 22, 2020	19.52	25.33	25.60		Nov 22, 2020 20:05	191.00	17.83	88.04	69.86
	Nov 24, 2020	8.53	38.17	4.10		Nov 25, 2020 21:25	188.00	9.95	86.48	72.29
	Nov 30, 2020	30.79	45.08	6.50		Dec 01, 2020 15:35	188.00	16.03	87.62	66.51
	Dec 04, 2020	9.00	4.83	24.00		Dec 04, 2020 12:05	181.00	11.24	95.06	76.85
	Dec 09, 2020	6.75	7.50	9.00		Dec 09, 2020 17:40	208.00	18.86	104.08	83.88
	Dec 12, 2020	9.50	3.25	9.00		Dec 13, 2020 02:10	209.00	14.56	104.58	46.52
	Dec 28, 2020	13.00	6.00	9.00		Dec 28, 2020 12:55	263.00	30.98	112.62	81.64
	Dec 30, 2020	5.50	7.50	3.00		Dec 30, 2020 14:50	248.00	14.96	99.69	74.97
	Jan 01, 2021	17.25	21.92	9.00		Jan 02, 2021 01:45	256.00	24.17	102.95	52.88

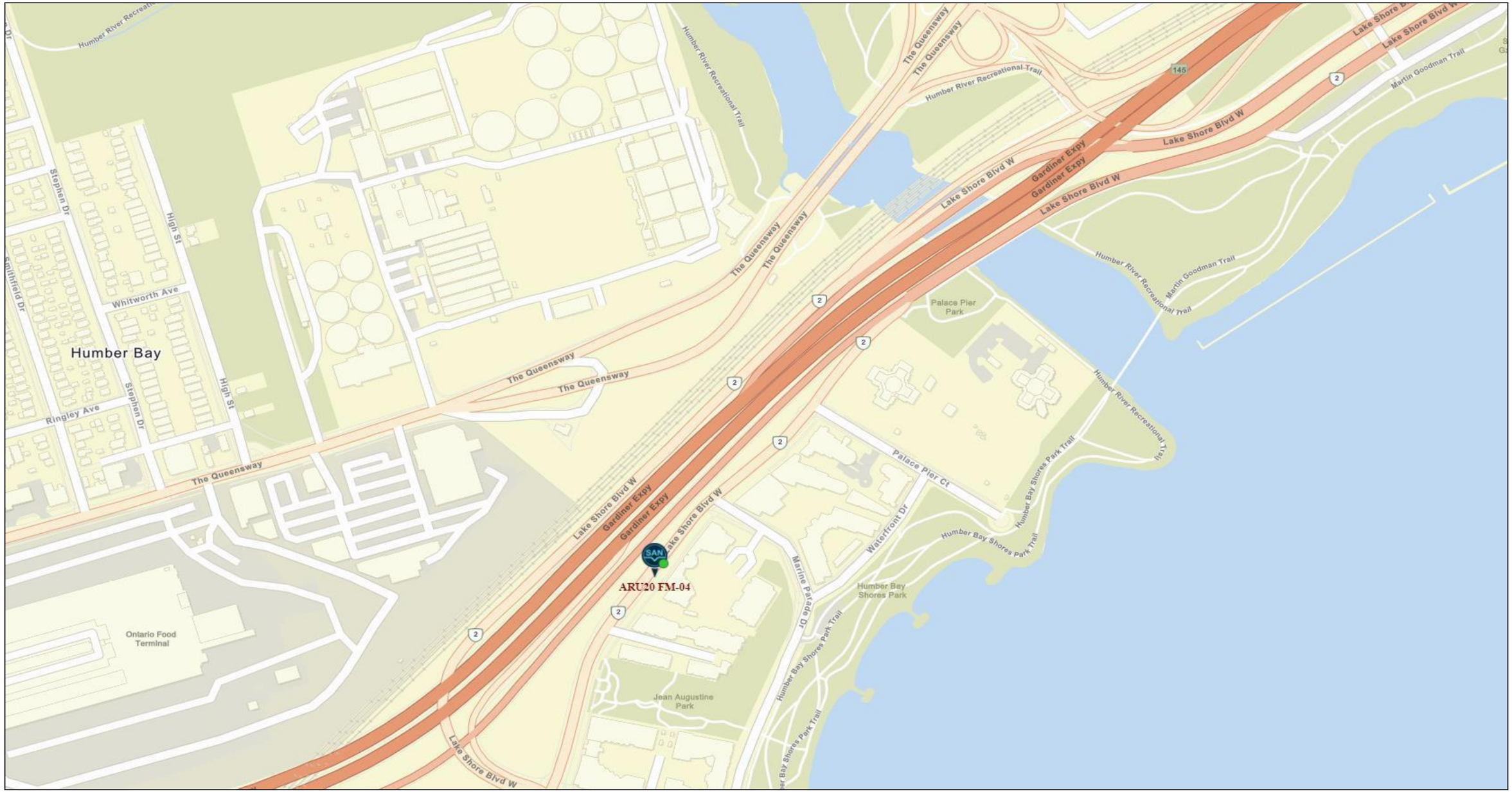
[1] An event is a storm with a minimum volume of 5mm and a minimum inter-event dry period of 12 hours
[2] I/I event analysis unable to be completed due to missing flow monitoring data during event

Activity Log

Station: ARU20 FM-03

Date Time	Type	Purpose of Visit	Comment	Calibration Measurement
19-Oct-2020 10:04:00 PM	Inspection Log	INSPECTION	UNSUITABLE FOR AV RING INSTALL, ALOT OF SILT BUILD UP IN THE CHANNEL AND MINIMAL FLOW	Yes
20-Oct-2020 10:10:00 AM	Maintenance Log	CALIBRATION	LOGGER SN: 20193379626 PMAC ID: 8063 DOWNWARDS SENSOR SN: 192924032-3E SITE IS NEAR SIDE WALK IN FRONT OF BUILDING AND BESIDE PALACE PIER CT BUS STOP INSTALLED DETECTRONIC LOGGER AV RING AND DOWNWARDS SENSOR SENT TELEMETRY ON SITE ACTIVATED LOGGER CALIBRATED SITE	Yes
08-Nov-2020 11:00:00 PM	Maintenance Log	CALIBRATION	SITE CALIBRATED DATA DOWNLOADED DEBRIS CLEARED TELEMETRY SENT	Yes
22-Nov-2020 10:30:00 PM	Maintenance Log	CALIBRATION AND DATA DOWNLOAD	site calibrated data downloaded Sent telemetry debris cleared	Yes
06-Dec-2020 09:07:00 PM	Maintenance Log	CALIBRATION	SITE CALIBRATED DATA DOWNLOADED DEBRIS CLEARED TELEMETRY SENT	Yes
20-Dec-2020 09:49:00 PM	Maintenance Log	CALIBRATION	DATA DOWNLOADED AND SITE CALIBRATED. TELEMETRY SENT. BATTERY SWAPPED	Yes
10-Jan-2021 09:26:00 PM	Removal Log	REMOVAL	DTECT LOGGER WITH USD AND AV REMOVED DATA DOWNLOADED. TELEMETRY SENT.	Yes

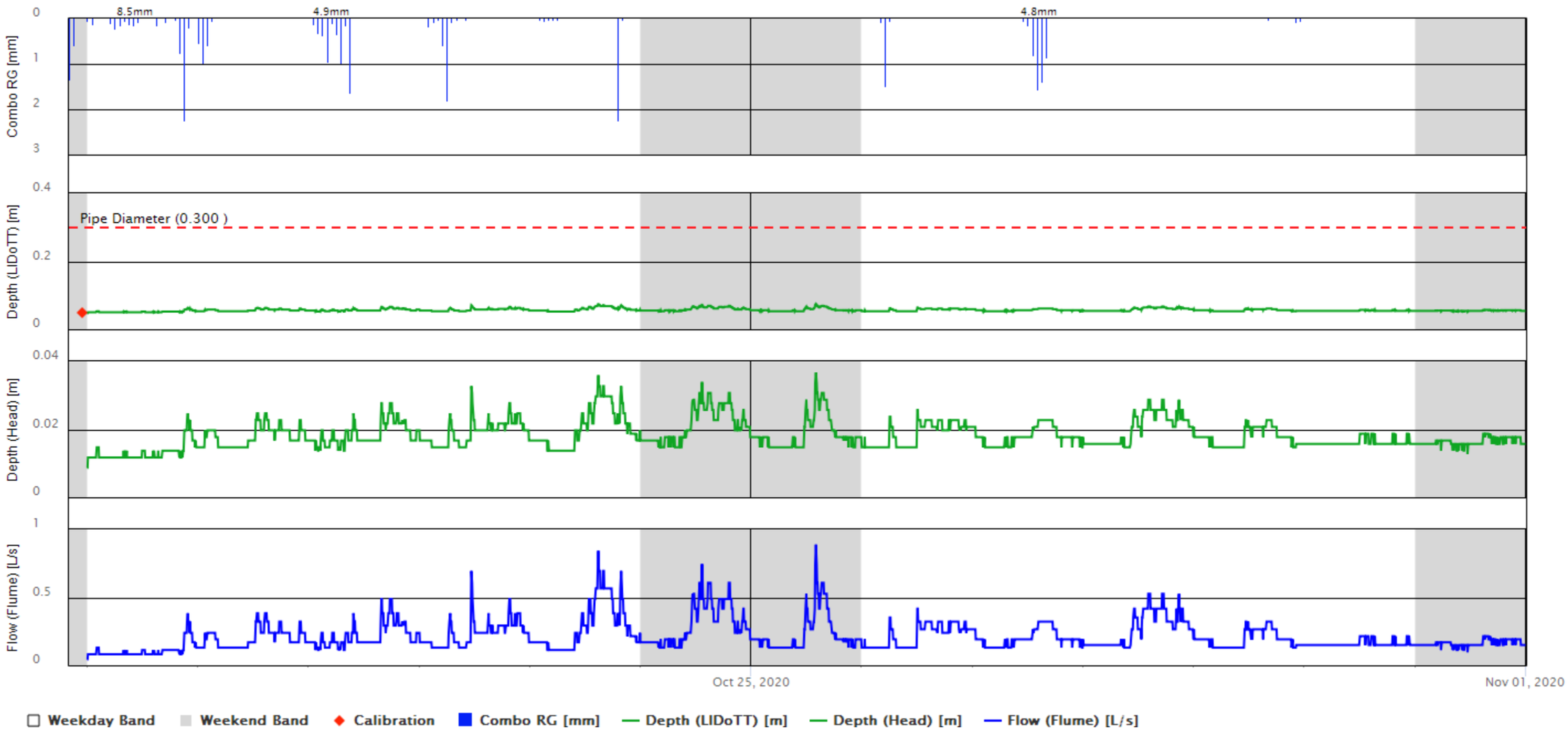
Station: ARU20 FM-04



Data Chart

Station: ARU20 FM-04[1]

Oct 18, 2020 – Oct 31, 2020

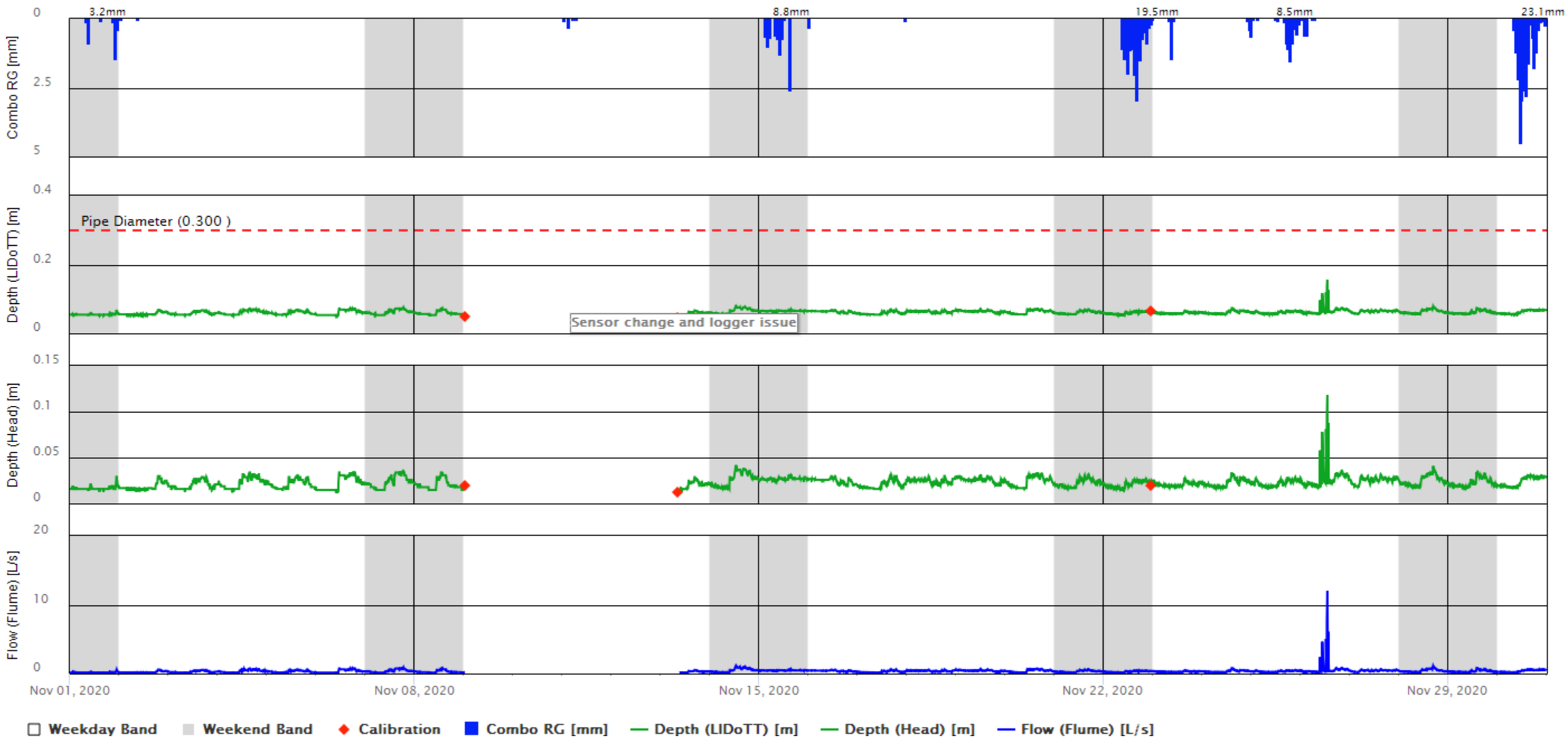


Low flow conditions resulted in low resolution

Data Chart

Station: ARU20 FM-04

Nov 01, 2020 – Nov 30, 2020

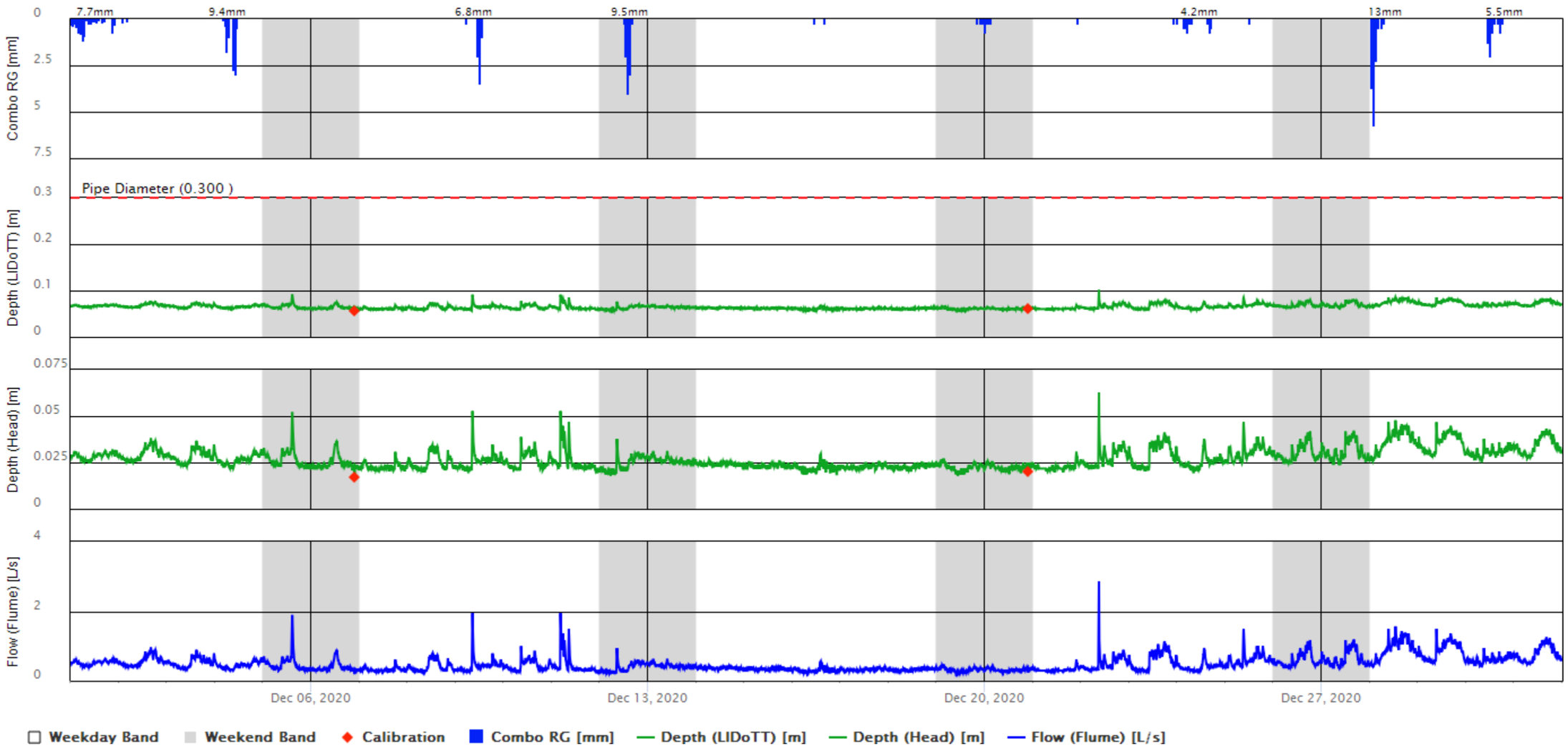


High resolution equipment was installed to replace original sensor and improve resolution

Data Chart

Station: ARU20 FM-04

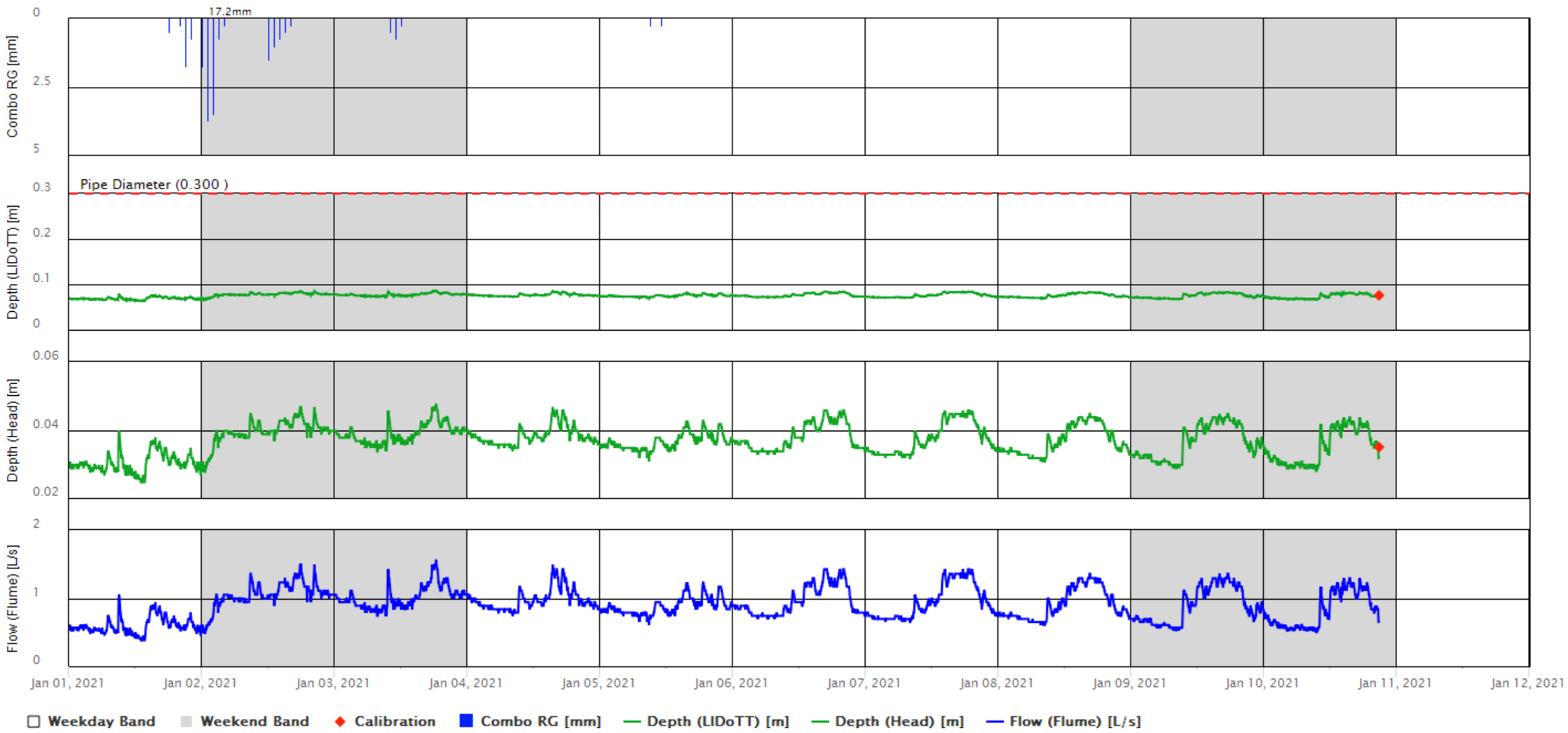
Dec 01, 2020 – Dec 31, 2020



Data Chart

Station: ARU20 FM-04

Jan 01, 2021 – Jan 12, 2021



Aggregate Data

Station: ARU20 FM-04

Level (Depth Head)

Date From	Date To	Days	Min (m)	Avg (m)	Max (m)	Count	Time of Min[1]	Time of Max[1]
Oct 18, 2020	Jan 11, 2021	82	0.01	0.03	0.12	22,903	Sun Oct 18, 2020 23:55	Thu Nov 26, 2020 13:05

Flow

Date From	Date To	Days	Min (L/s)	Avg (L/s)	Max (L/s)	Total Volume (1,000,000 L)	Count	Time of Min[1]	Time of Max[1]
Oct 18, 2020	Jan 11, 2021	82	0.04	0.45	12.02	3.08	22,903	Sun Oct 18, 2020 23:55	Thu Nov 26, 2020 13:05

Precipitation

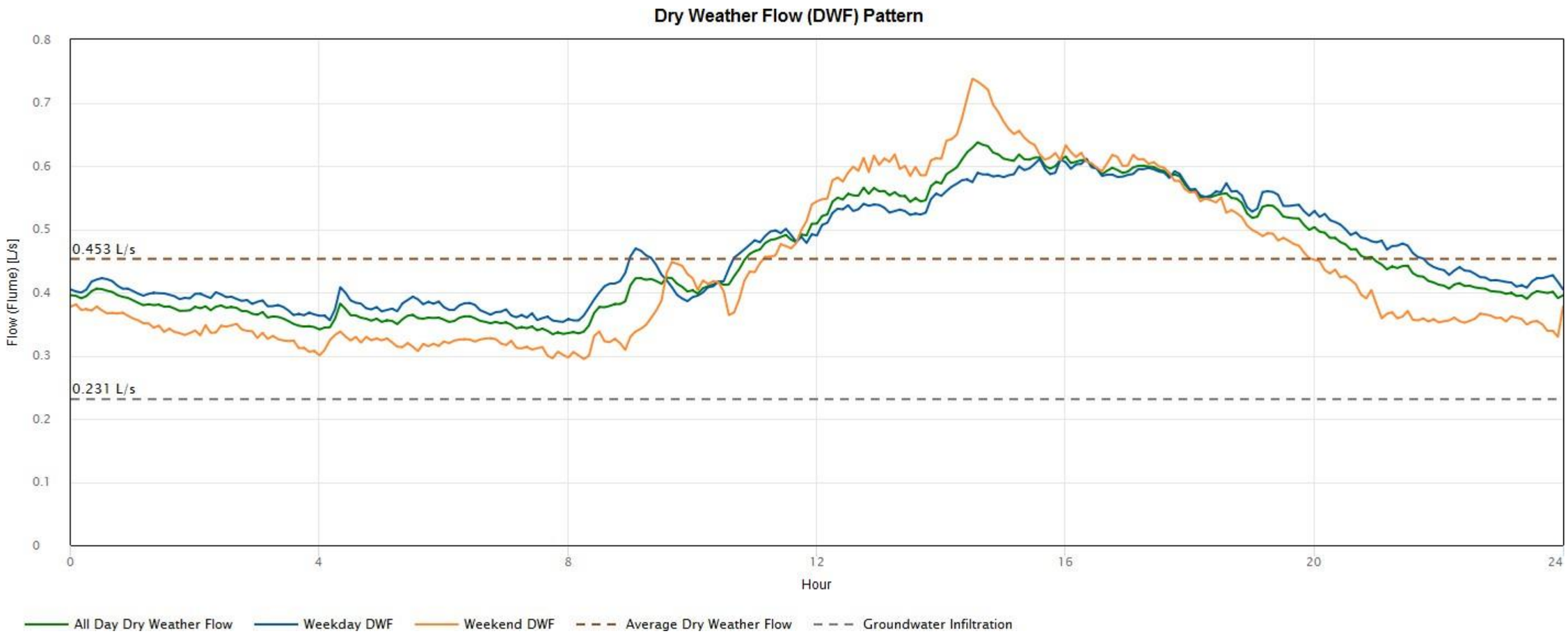
Date From	Date To	Days	Min (mm)	Avg (mm)	Max (mm)	Sum (mm)	Count	Time of Min[1]	Time of Max[1]
Oct 18, 2020	Jan 11, 2021	82	0.00	0.01	2.00	70.50	11,780	Fri Dec 04, 2020 07:00	Fri Dec 04, 2020 09:55

[1] Time of Min and Time of Max will be displayed by first occurrence

Sanitary Report

Station: ARU20 FM-04

Average Dry Weather Flow (L/s)	Average Dry Weather Flow (L/c/d)	Average Daily Minimum Dry Weather Flow (L/s)	Average Daily Peak Dry Weather Flow (L/s)
0.453	N/A[2]	0.272	0.870
Peaking Factor	**Groundwater Infiltration (L/s)[1]**	**Groundwater Infiltration (L/ha/d)**	**% of GWI in Average DWF**
1.923	0.231	7,477.265	51.059



[1] Industry standard Groundwater infiltration (GWI) is assumed as 85% of the daily minimum flow averaged over the monitoring period
[2] No population data provided, per capita value is not present

I/I Analysis Table

Station: ARU20 FM-04

Measured Storms	Event[1]	Total Precipitation (mm)	Duration (hours)	Peak Intensity Over Tc at Station (mm/hr)	Flow KPIs	ARU20 FM-04				
						Time of Peak I/I Flow (TD) (date)	Peak Depth (mm)	Peak I/I Flow (L/s)	Measured Peak Flow (L/s)	Estimated Dry Weather Flow at TD (L/s)
	Oct 18, 2020	8.54	31.92	5.61		No Data[2]				
	Nov 15, 2020	8.76	22.00	20.50		Nov 15, 2020 09:20	76.00	0.31	0.94	0.18
	Nov 22, 2020	19.52	25.33	25.60		Nov 22, 2020 10:30	66.00	0.12	0.49	0.20
	Nov 24, 2020	8.53	38.17	4.10		Nov 26, 2020 13:05	156.00	11.61	12.02	0.41
	Nov 30, 2020	30.79	45.08	6.50		Dec 02, 2020 16:05	76.00	0.51	0.94	0.43
	Dec 04, 2020	9.00	4.83	24.00		Dec 04, 2020 23:15	73.00	0.29	0.79	0.37
	Dec 09, 2020	6.75	7.50	9.00		Dec 09, 2020 08:25	91.00	1.63	1.95	0.32
	Dec 12, 2020	9.50	3.25	9.00		Dec 13, 2020 02:40	76.00	0.26	0.94	0.35
	Dec 28, 2020	13.00	6.00	9.00		Dec 28, 2020 12:50	86.00	0.94	1.56	0.62
	Dec 30, 2020	5.50	7.50	3.00		Dec 31, 2020 01:35	76.00	0.32	0.94	0.47
	Jan 01, 2021	17.25	21.92	9.00		Jan 02, 2021 20:20	85.00	0.91	1.49	0.59

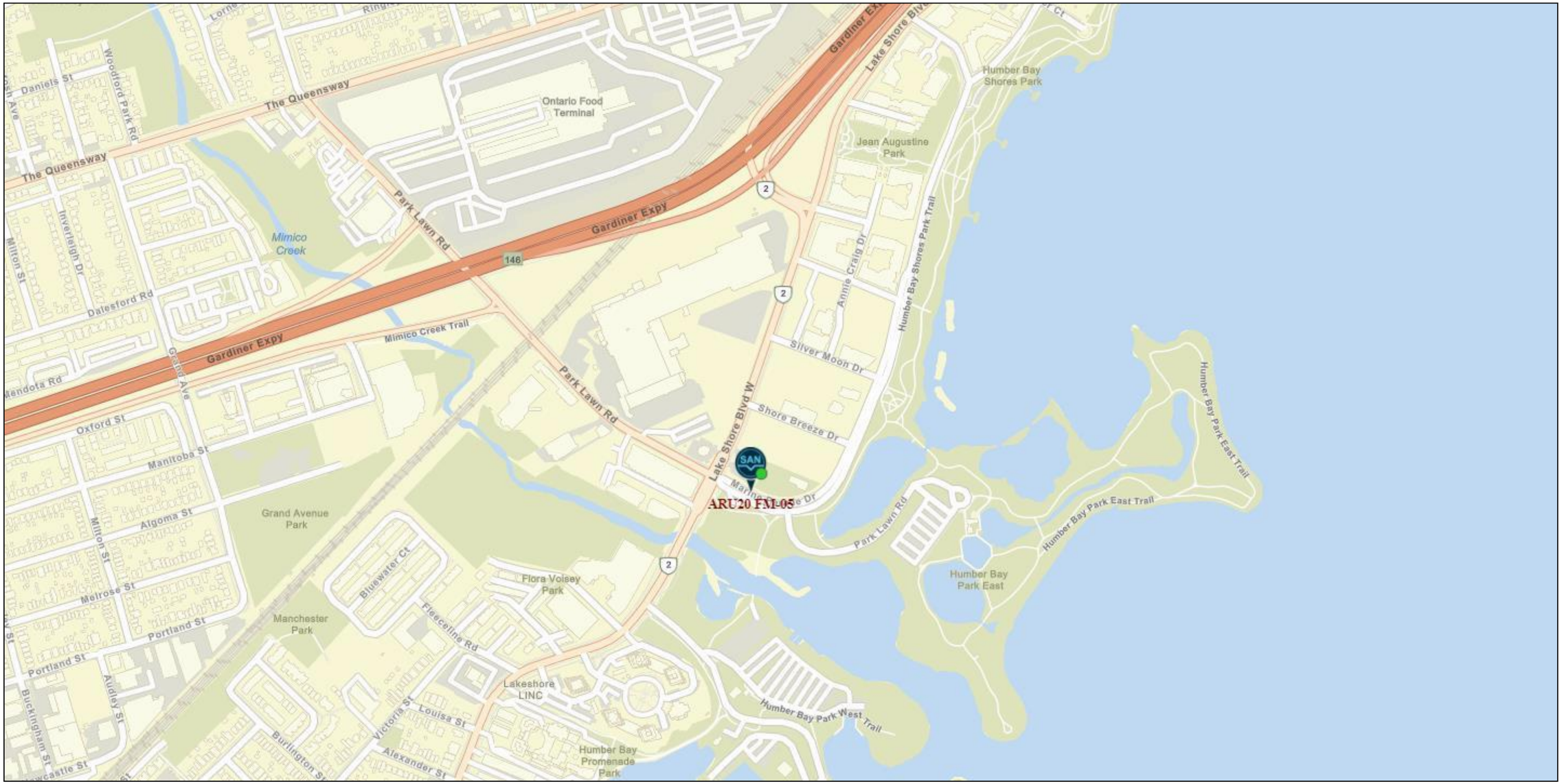
[1] An event is a storm with a minimum volume of 5mm and a minimum inter-event dry period of 12 hours
[2] I/I event analysis unable to be completed due to missing flow monitoring data during event

Activity Log

Station: ARU20 FM-04

Date Time	Type	Purpose of Visit	Comment	Calibration Measurement
18-Oct-2020 11:00:00 PM	Installation Log	INSTALLATION OF DETECTRONIC DOWNWARDS SENSOR AND AV RING	LOGGER SN: 20193279136 PMAC ID: 8050 DOWNWARDS SENSOR SN: 192825027-0 PRESSURE HEAD: 10 mm	Yes
09-Nov-2020 12:37:00 AM	Installation Log	INSTALLATION OF LIDOTT SENSOR	DATA DOWNLOADED (OLD), SITE CALIBRATED, DEBRIS CLEARED, SENT TELEMETRY ON SITE, LIDDOT SENSOR INSTALLED, EMPTY DIST: 440+18=458mm, FLUME HEAD IS 5 mm LOGGER SN: 20193279114 PMAC: 8092 LIDOTT SENSOR SN: 1032020330044	Yes
10-Nov-2020 09:36:00 AM	Maintenance Log	CALIBRATION	SITE CALIBRATED DATA DOWNLOADED	Yes
13-Nov-2020 08:30:00 AM	Maintenance Log	CALIBRATION AND DATA DOWNLOAD	SITE CALIBRATED CHECKED SETTINGS IN DIALOUT SETTING DATA DOWNLOADED DEBRIS CLEARED SENT TELEMETRY ON SITE	Yes
22-Nov-2020 11:00:00 PM	Maintenance Log	CALIBRATION AND DATA DOWNLOAD	SITE CALIBRATED DEBRIS CLEARED TELEMETRY SENT DATA DOWNLOADED	Yes
06-Dec-2020 09:34:00 PM	Maintenance Log	CALIBRATION	SITE CALIBRATED DATA DOWNLOADED DEBRIS CLEARED TELEMETRY SENT	Yes
20-Dec-2020 09:38:00 PM	Maintenance Log	CALIBRATION	DATA DOWNLOADED AND SITE CALIBRATED. TELEMETRY SENT	Yes
10-Jan-2021 08:53:00 PM	Removal Log	REMOVAL	DTECT LOGGER WITH LIDOT AND FLUME REMOVED. DATA DOWNLOADED. TELEMETRY SENT.	Yes

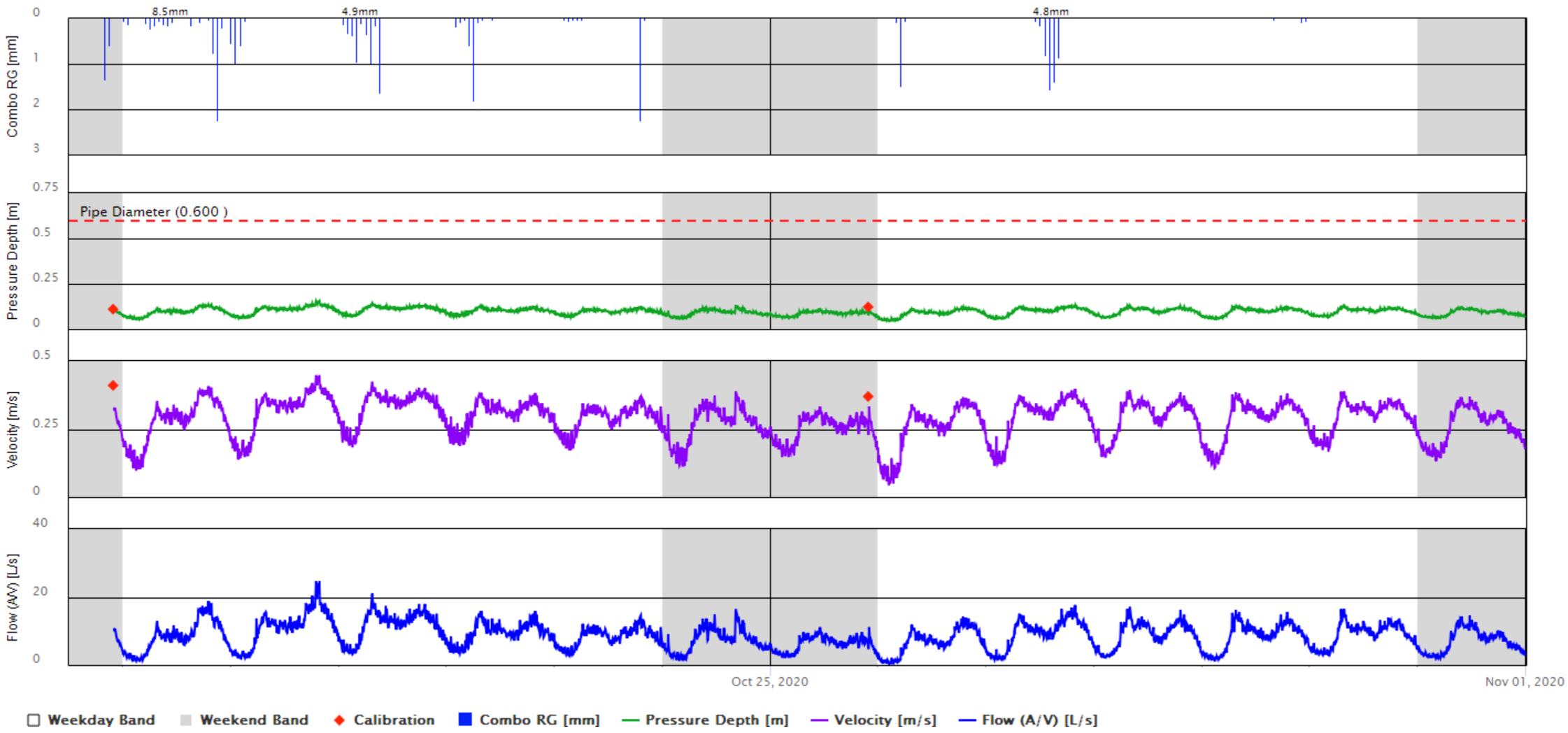
Station: ARU20 FM-05



Data Chart

Station: ARU20 FM-05

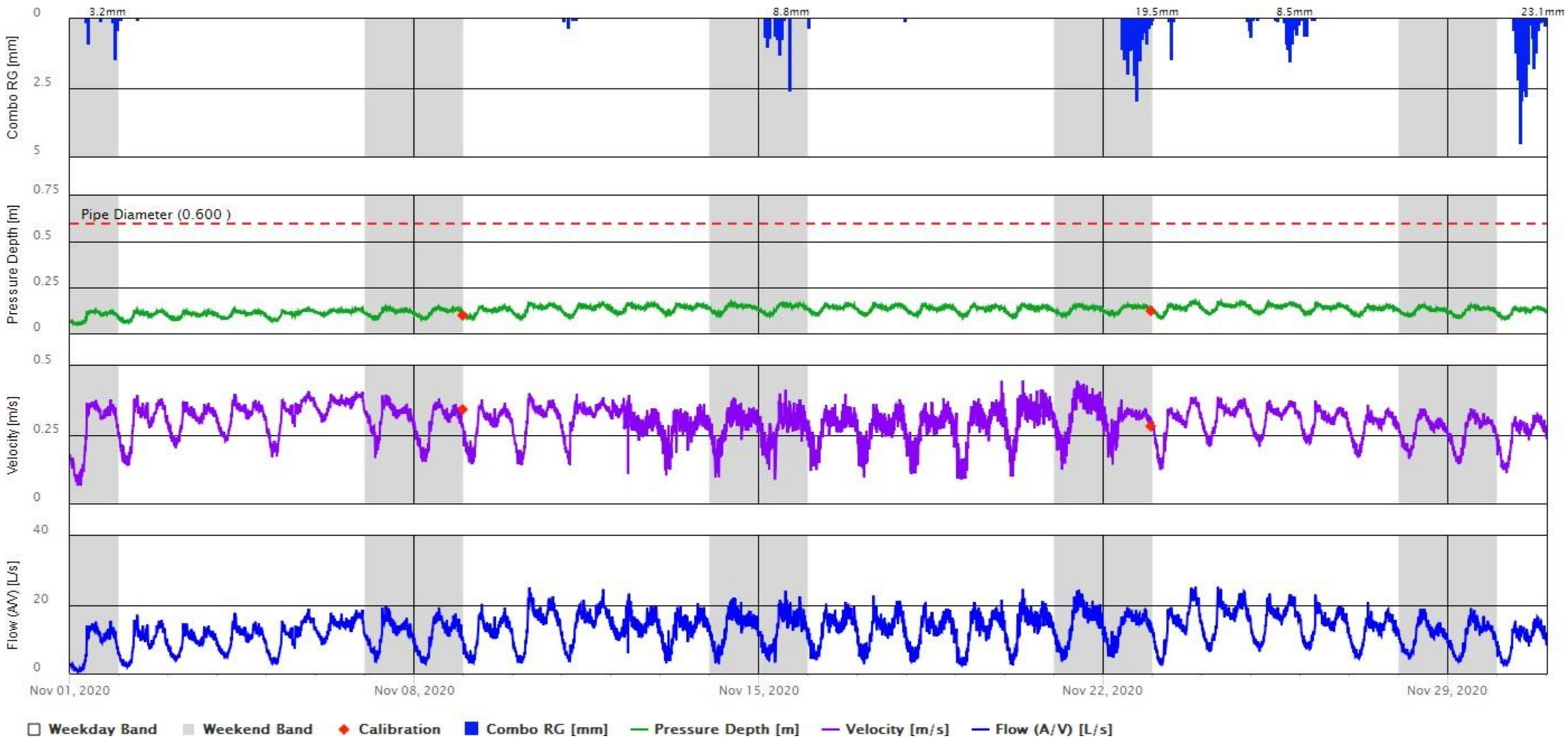
Oct 18, 2020 – Oct 31, 2020



Data Chart

Station: ARU20 FM-05

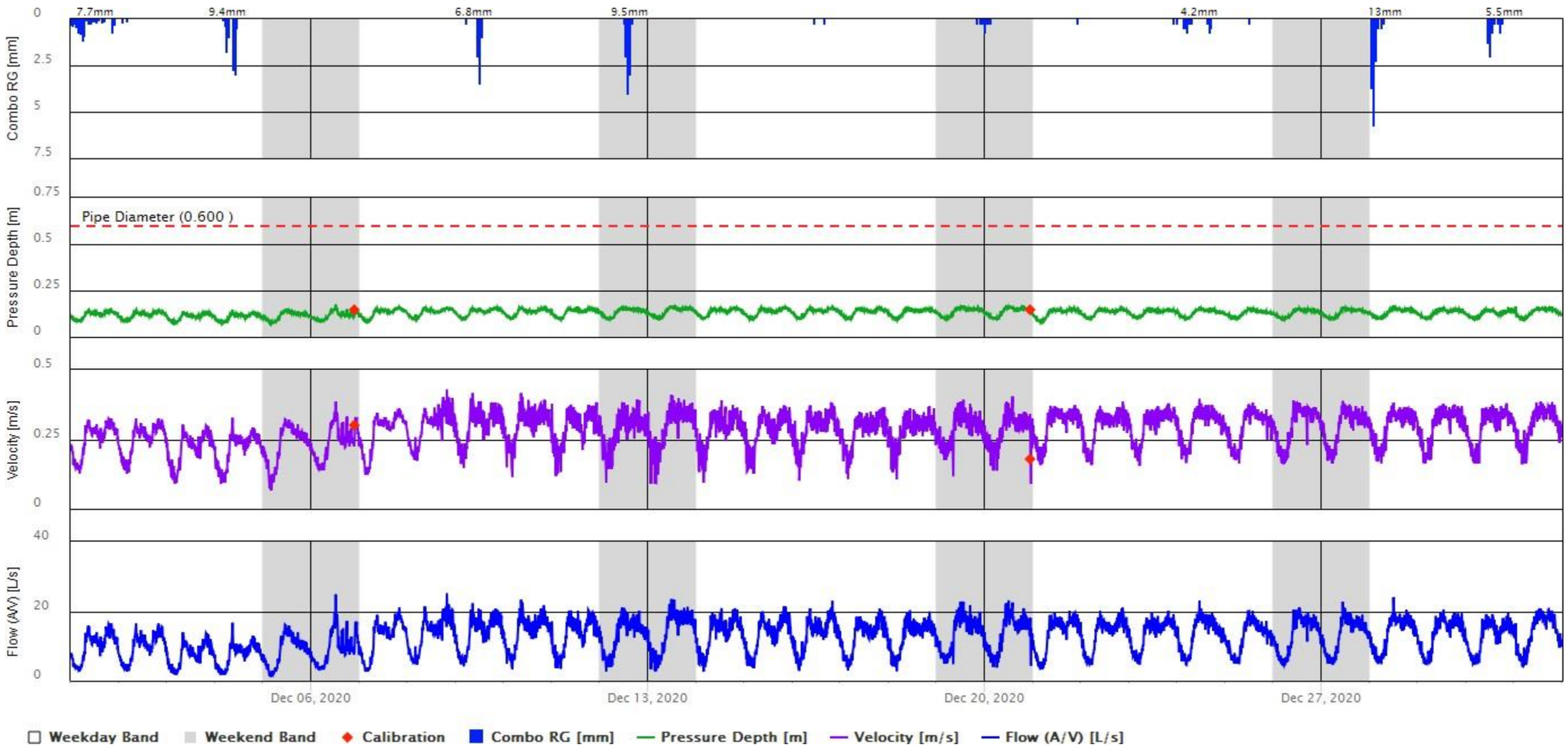
Nov 01, 2020 – Nov 30, 2020



Data Chart

Station: ARU20 FM-05

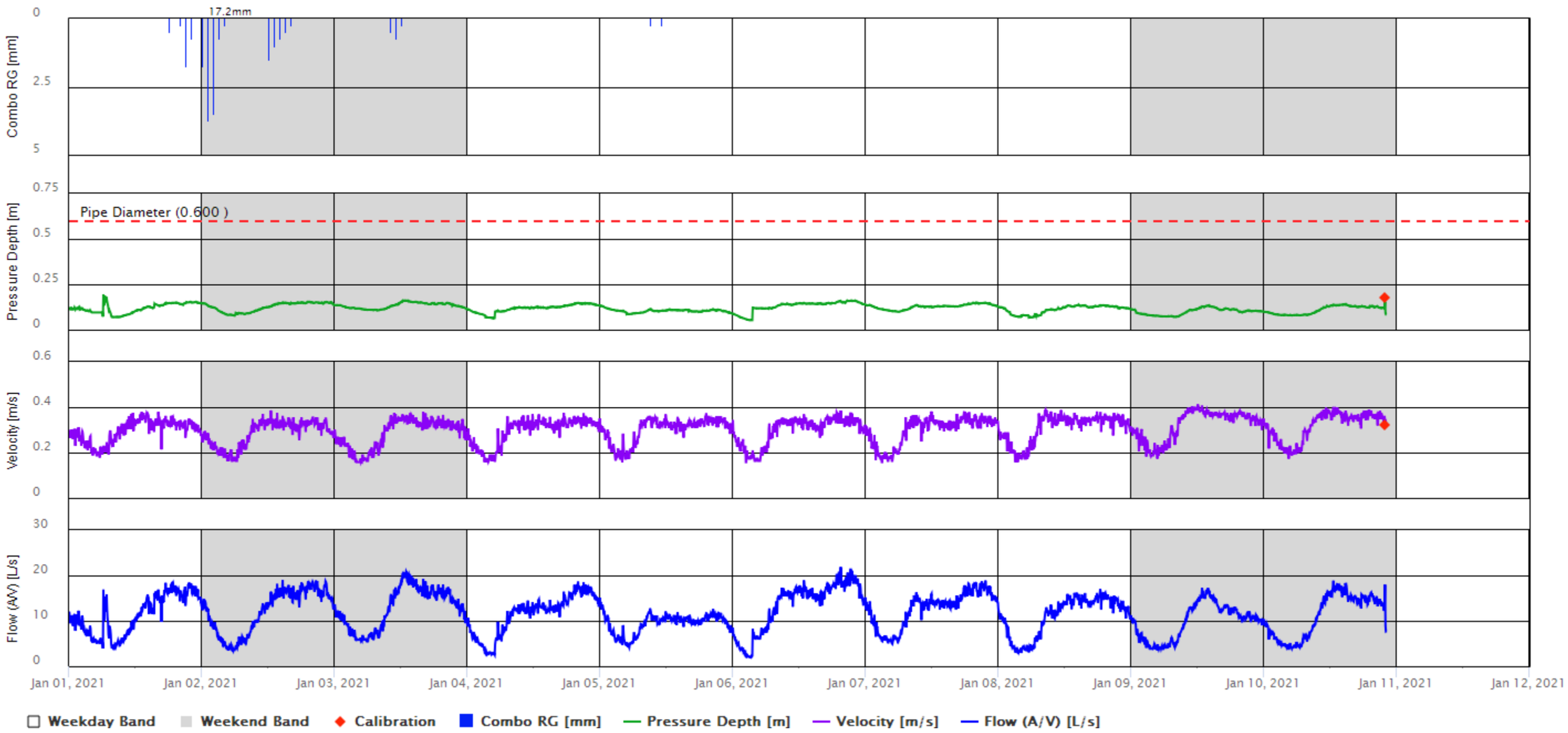
Dec 01, 2020 – Dec 31, 2020



Data Chart

Station: ARU20 FM-05

Jan 01, 2021 – Jan 12, 2021



Aggregate Data

Station: ARU20 FM-05

Level

Date From	Date To	Days	Min (m)	Avg (m)	Max (m)	Count	Time of Min[1]	Time of Max[1]
Oct 18, 2020	Jan 11, 2021	85	0.05	0.12	0.19	24,195	Mon Oct 26, 2020 02:20	Fri Jan 01, 2021 06:10

Velocity

Date From	Date To	Days	Min (m/s)	Avg (m/s)	Max (m/s)	Count	Time of Min[1]	Time of Max[1]
Oct 18, 2020	Jan 11, 2021	85	0.04	0.29	0.48	24,195	Mon Oct 26, 2020 02:20	Wed Nov 11, 2020 20:00

Flow

Date From	Date To	Days	Min (L/s)	Avg (L/s)	Max (L/s)	Total Volume (1,000,000 L)	Count	Time of Min[1]	Time of Max[1]
Oct 18, 2020	Jan 11, 2021	85	0.40	11.93	30.60	86.59	24,195	Mon Oct 26, 2020 02:20	Wed Nov 11, 2020 20:00

Precipitation

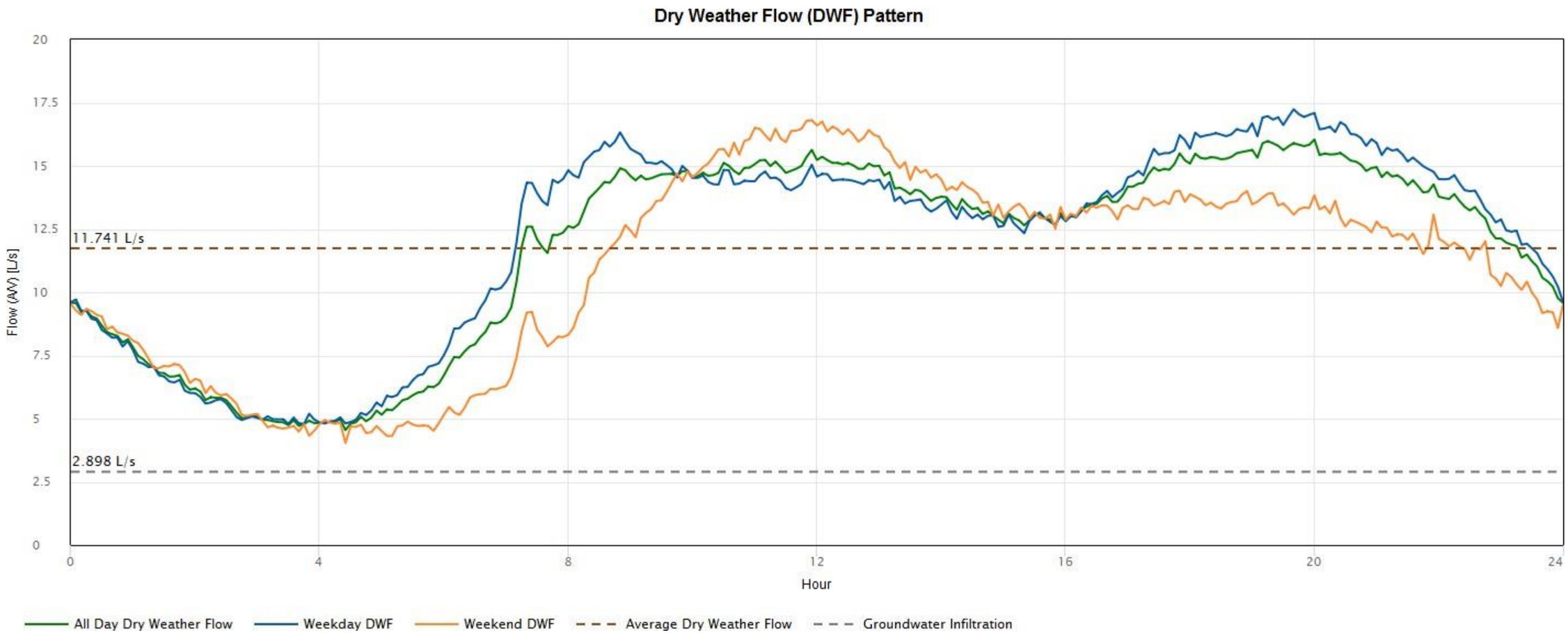
Date From	Date To	Days	Min (mm)	Avg (mm)	Max (mm)	Sum (mm)	Count	Time of Min[1]	Time of Max[1]
Oct 18, 2020	Jan 11, 2021	85	0.00	0.01	2.00	70.50	11,780	Fri Dec 04, 2020 07:00	Fri Dec 04, 2020 09:55

[1] Time of Min and Time of Max will be displayed by first occurrence

Sanitary Report

Station: ARU20 FM-05

Average Dry Weather Flow (L/s)	Average Dry Weather Flow (L/c/d)	Average Daily Minimum Dry Weather Flow (L/s)	Average Daily Peak Dry Weather Flow (L/s)
11.741	166.907	3.409	20.078
Peaking Factor	**Groundwater Infiltration (L/s)[1]**	**Groundwater Infiltration (L/ha/d)**	**% of GWI in Average DWF**
1.710	2.898	39,177.738	24.678



[1] Industry standard Groundwater infiltration (GWI) is assumed as 85% of the daily minimum flow averaged over the monitoring period

I/I Analysis Table

Station: ARU20 FM-05

Measured Storms					Flow KPIs	ARU20 FM-05				
	Event[1]	Total Precipitation (mm)	Duration (hours)	Peak Intensity Over Tc at Station (mm/hr)		Time of Peak I/I Flow (TD) (date)	Peak Depth (mm)	Peak I/I Flow (L/s)	Measured Peak Flow (L/s)	Estimated Dry Weather Flow at TD (L/s)
	Oct 18, 2020	8.54	31.92	5.60		Oct 20, 2020 05:40	137.00	9.44	18.83	4.24
	Nov 15, 2020	8.76	22.00	20.50		Nov 15, 2020 19:50	167.00	7.18	24.09	15.22
	Nov 22, 2020	19.52	25.33	25.60		Nov 23, 2020 20:50	175.00	8.72	25.16	16.44
	Nov 24, 2020	8.53	38.17	4.10		Nov 26, 2020 07:15	171.00	7.30	23.87	15.62
	Nov 30, 2020	30.79	45.08	6.50		Dec 02, 2020 03:45	146.00	0.35	16.40	4.49
	Dec 04, 2020	9.00	4.83	24.00		Dec 03, 2020 18:55	147.00	0.00	16.68	0.00
	Dec 09, 2020	6.75	7.50	9.00		Dec 09, 2020 11:30	162.50	5.54	25.12	15.10
	Dec 12, 2020	9.50	3.25	9.00		Dec 12, 2020 19:40	160.00	5.48	21.04	14.61
	Dec 28, 2020	13.00	6.00	9.00		Dec 28, 2020 11:50	171.00	7.69	24.00	16.31
	Dec 30, 2020	5.50	7.50	3.00		Dec 31, 2020 00:45	165.00	6.57	19.45	9.97
	Jan 01, 2021	17.25	21.92	9.00		Jan 02, 2021 22:25	193.50	4.90	19.02	13.60

[1] An event is a storm with a minimum volume of 5mm and a minimum inter-event dry period of 12 hours

Activity Log

Station: ARU20 FM-05

Date Time	Type	Purpose of Visit	Comment	Calibration Measurement
18-Oct-2020 09:54:00 PM	Installation Log	INSTALL	DTECT LOGGER INSTALLED AND STARTED. TELEMETRY SENT. HAD TO FABRICATE NEW RING ON SITE. NEW METAL TOO THICK AND WOULDN'T HUG THE WALLS.	Yes
25-Oct-2020 09:52:00 PM	Maintenance Log	CALIBRATION AND DATA DOWNLOAD		Yes
08-Nov-2020 11:45:00 PM	Maintenance Log	CALIBRATION	SITE CALIBRATED ALOT OF SILT BUILD UP DATA DOWNLOADED DEBRIS CLEARED TELEMETRY SENT	Yes
22-Nov-2020 11:15:00 PM	Maintenance Log	CALIBRATION AND DATA DOWNLOAD	SITE CALIBRATED DATA DONWLOADED SENT TELEMETRY DEBRIS CLEARED	Yes
06-Dec-2020 09:54:00 PM	Maintenance Log	CALIBRATION	SITE CALIBRATED DATA DOWNLOADED DEBRIS CLEARED TELEMETRY SENT	Yes
20-Dec-2020 10:35:00 PM	Maintenance Log	CALIBRATION	DATA DOWNLOADED AND SITE CALIBRATED. TELEMETRY SENT	Yes
10-Jan-2021 10:00:00 PM	Removal Log	REMOVAL	DTECT LOGGER WITH USD AND AV REMOVED DATA DOWNLOADED. TELEMETRY SENT.	Yes

Appendix I

Hydrological Review

FCR (Park Lawn) LP and CPPIB
Park Lawn Canada Inc.

2150 Lake Shore

Hydrological Review

Issue 01 | May 15, 2020

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 264635-00

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ARUP

Document Verification

ARUP

Job title		2150 Lake Shore			**Job number** 264635-00
Document title		Hydrological Review			**File reference**
Document ref					
Revision	**Date**	**Filename**	HydroG Report Rev00.docx		
Draft 1	May 01, 2020	**Description**	First draft – For Comment		
			Prepared by	Checked by	Approved by
		Name	James Collins / Corey Fan	Natasha Wilkinson	Henry Jeens
		Signature			
Issue 01	May 15, 2020	**Filename**	Hydrological Review_Issue 01.docx		
		Description	First issue – For planning submission		
			Prepared by	Checked by	Approved by
		Name	Various	Natasha Wilkinson	James Collins
		Signature		N Wilkinson	See stamp
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
				Issue Document Verification with Document	✓

Executive Summary

This hydrological review has been prepared in accordance with the requirements for a Hydrological Review set out by the City of Toronto[1].

The current Master Plan features a range of land uses including a new public park, and a diverse mix of residential, retail, service, entertainment and employment uses and a range of building types. Fifteen towers are proposed on the site with heights ranging from 16 to 70 storeys. The current Master Plan includes 6 phases, each of which includes a basement ranging from 3 to 5 levels to a minimum basement slab elevation of +65.5 meters above sea level (masl) approximately 20 meters below ground surface (mbgs).

Analysis of groundwater discharge has been carried out for each individual development phase (1 to 6) and collectively for phases 1 to 5. The initial analysis has been carried out using available data as discussed in this report and considers an open excavation. Assumptions have been made regarding the benefit of the proposed secant pile perimeter wall and the associated reduction in groundwater discharge based on local experience (i.e., a minimum of 25% of the anticipated discharge without the secant pile perimeter wall). These results are presented in Table 8 and show groundwater discharge ranging from 13 to 18 m^3/day for individual development phases, with a combined total of 91 m^3/day for all basements.

Based on the current design approach for the basements – secant pile perimeter walls – and the anticipated groundwater inflows, a Private Water Drainage System (PWDS) including drainage below the basement floor and perimeter drainage is suitable. Ministry of Environment (MOE) Permit to Take Water (PTTW) will be required where dewatering volume exceeds 50,000 L/days (50. m^3/day). In addition, Private Water Discharge permit is also required by City of Toronto to discharge water to the municipal storm sewer system. Based on the initial analysis carried out, it is anticipated that PTTW will be required.

This report is based on previous ground investigation work carried out at the site and a review of historical records within and surrounding the site. Although ground investigations have been carried out within the site, ground investigation has yet to be completed specifically for the current proposed development. As a result, analysis in this report is based on available field and lab testing and does not include data obtained from slug tests, pumping tests, or long-term groundwater monitoring. Gaps in the available data for further design stages will be addressed by further site investigation and analysis. The results of these further investigations can be provided to the City of Toronto if required.

[1] Refer to the following City of Toronto website for more detail <https://www.toronto.ca/wp-content/uploads/2018/08/97bb-Hydrological-Review-August-2018.pdf>.

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1 Introduction

1.1 Proposed Development

In October 2019, FCR (Park Lawn) LP and CPPIB Park Lawn Canada Inc. ('the Owners') made an application for an Official Plan Amendment (OPA) in support of a proposed Master Plan for the redevelopment of the 27.7 acre / 11.2 hectare site located on the northeast corner of Park Lawn Road and Lake Shore Boulevard West, municipally known as 2150-2194 Lake Shore Boulevard West and 23 Park Lawn Road site ("the site" or "2150 Lake Shore") as shown in Figure 1.

Figure 1 - Site Location and Boundary

The original Master Plan proposal envisioned a vibrant, mixed-use, transit-oriented redevelopment of the site. The Master Plan included a new Park Lawn GO Station, related TTC transit improvements, a fine-grained network of new streets and connections, a range of new open spaces including a new public park, and a diverse mix of residential, retail, service, entertainment and employment uses.

The current Master Plan features the same variety of land uses with a range of building types that blend forms and uses, and respond to the distinct geometry of the proposed street and block pattern. Fifteen towers are proposed on the site with heights ranging from 16 to 70 storeys, with the tallest towers generally clustered near the GO Station. The towers feature generous separation distances and are interspersed with a range of standalone mid-rise and low-rise building typologies to create a sense of place and urban fabric that appears to have evolved over time.

The current Master Plan includes 6 phases, each of which includes a basement. Phases 1 to 5 include three (3) levels of basement with the lowest basement slab

located at +68.7 masl. Phase 6 includes five (5) levels of basement with the lowest basement slab located at +65.5 masl.

1.2 Scope and Limitations

Arup was retained by FCR (Park Lawn) LP and CPPIB Park Lawn Canada Inc to prepare a Hydrological Review for the Zoning By-law Amendment application.

This review has been prepared in accordance with the following:

- Ontario Water Resources Act
- Ontario Regulation 64/16
- Ontario Regulation 387/04
- Toronto Municipal; Code, Chapter 681 - Sewers

This report is based on previous ground investigation work at the site. There are gaps in some of the specific requirements from City of Toronto checklist as ground investigation has yet to be carried out at the site for the proposed development. These will be addressed by further site investigation and analysis to inform further design stages. The results of these further investigations can be provided to the City of Toronto if required.

This report summarizes the findings from available relevant investigations and provides an assessment on geology, physical hydrology, a site-specific hydrological model, analysis of available groundwater information, and an analytical assessment of anticipated groundwater inflow into basements.

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Arup's responsibility is limited to a review of the available information at the time of writing this report. The information presented includes assessment of data and to some degree of interpretation of data. Ground and groundwater information may vary between and beyond boreholes.

2 Study Area

The site is located at 2150 Lake Shore Boulevard West (postal code M8V 1A3), in the Etobicoke-Lakeshore area of the Toronto City District of Etobicoke-York. The site is approximately 11.2 hectares and polygonal but broadly triangular in shape. Bounded to the northwest by CN railway line and the Gardener Expressway eastbound off ramp, bounded to the east by Lake Shore Boulevard West, and the southwest by Park Lawn Road.

2.1 Topography

The site is generally flat, with existing elevation across the site typically ranging from approximately +84 masl and +86 masl. Beyond the typical ranges, the site elevation increases several metres at the northern boundary due to fill slopes associated with the adjacent the Canada National Railway and the Gardener Expressway east bound off ramp. Beyond the typical ranges, the site elevation reduces in the southern corner. It should be noted that significant grading to form the final formation level for the proposed development.

2.2 Hydrology

The site is located within the Humber Bay area between the Humber River approximately 800 m to the northeast, and Mimco Creek, approximately 210 m to the southwest, roughly parallel but beyond Park Lawn Road. Lake Ontario is located approximately 250 m to 300 m to the southeast beyond existing residential developments and parklands. The road along the southeastern boundary of the site, Lake Shore Boulevard West, marks the approximate location of the former lakeshore (Toronto Transportation Commission – Contour Map of Toronto District, 1921). This indicates that the existing developments and parkland to the southeast of Lake Shore Boulevard West are largely located on reclaimed land. Historical maximum water levels of Lake Ontario are +75.91 masl and +75.81 masl in 2019 and 2017 respectively.

3 Geology

3.1 Published Geological Information

The map of Quaternary Geology of Toronto and the Surrounding Area (1980), an excerpt of which is presented as Figure 1, indicates that the site is underlain by Older Lake Deposits of silt and clay. Beneath the Older Lake Deposits there is potential for presence of the Older Till consisting of silty clay to silt and clayey sand. Beneath the Quaternary Deposits the bedrock is formed of shale, interbedded with siltstone and occasional limestone.

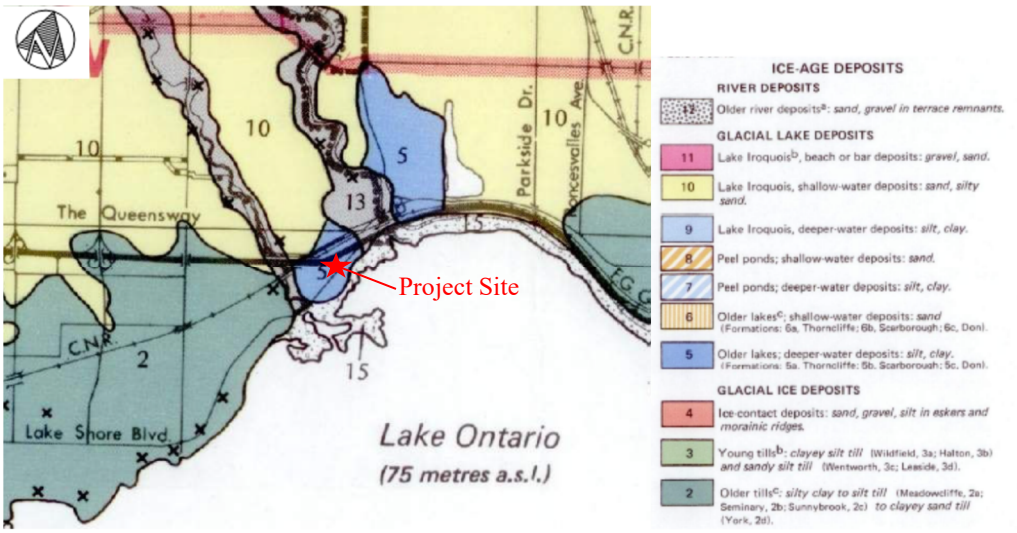


Figure 2: Regional Geology of Project Site (Quaternary Geology of Toronto and the Surrounding Area, 1980)

3.2 Relevant Reports and Information

A summary of locations of boreholes discussed in the section and used in determining geology and physical hydrology conditions within the study area are presented in drawing LSB-ARP-XX-XX-DR-GE-10000 – see Appendix A.

3.2.1 Relevant Existing Reports

A search of ground investigation information within the site and surrounding area has been carried out using the following resources:

- Ontario Ministry of Transport Foundation Library;
- Ontario Geotechnical Boreholes. Maintained by Ontario Geological Survey (OGS) and the Ministry of Natural Resources (MNR);

- Ontario Well Database. Maintained by the Ministry of the Environment Conservation and Parks; and
- Existing Toronto Development Projects Planning Applications.

Table 1, below, summarizes reports and boreholes that have been considered in preliminary determination of the site-specific geological and physical hydrology conditions.

Table 1 - Summary of Available Ground Investigation Reports

Source	Document Type	Relevant Boreholes
Ontario Ministry of Transport Foundation Library	Foundation Investigation Report – 30M11-094 (1970)	BH9 and BH10
	Foundation Investigation Report – 30M11-097 (1970)	BH107 and BH109
Ontario Geotechnical Boreholes (Maintained by OGS and MNR)	Summary of borehole details including completion date, strata summary, and ground water depth.	604058, 604070, 604069, 655256, 655257, 604066, 604068, 604067, 604054, 604053
Ontario Well Records Database	Summary of borehole details including completion date, strata summary, and ground water depth.	7285078, 7285077, 7285076, 7263502, 7263501, 7263500, 7259674, 7240357, 7240318, 7240317, 7240313, 7240312, 7240311, 7239937, 7239893, 7239892, 7239725, 7238437, 7238436, 7238435, 7237317, 7237316, 7237315, 7237314, 7237313, 7228463, 7228462, 7228461, 7228460, 7228459, 7228458, 7228457, 7228456, 7228455, 7224069, 7224067, 7224066, 7222642, 7222641, 7222640, 7221374, 7220952, 7217527, 7217526, 7213513, 7213512, 7213466, 7213439, 7213438, 7213437, 7210364, 7208830, 7208829, 7207615, 7207614, 7207613, 7207612, 7207611, 7207610, 7207609, 7206537, 7206536, 7206535, 7206534, 7205802, 7205677, 7204521, 7203995, 7198955, 7198107, 7198106, 7198105, 7195874, 7195873, 7195661, 7193857, 7193856, 7188200, 7188199, 7188198, 7182493, 7181302, 7174363, 7174362, 7174361, 7174360, 7174359, 7174358, 7174357, 7154076, 7137708, 7123282, 7108871, 7046382, 6928586,

Source	Document Type	Relevant Boreholes
Toronto Development Projects Planning Applications	Preliminary Geotechnical Investigation for Proposed High-rise Buildings 2161 to 2165 Lake Shore Boulevard West.	BH13-1 BH13-2 BH13-3 BH13-4

3.2.2 Site Specific Reports

Three site specific geotechnical/environmental reports have been provided:

- Preliminary Geotechnical Investigation, 2150 Lake Shore Boulevard West Toronto, Ontario (CRA, 2013)
- Phase 1 Environmental Site Assessment, 2150 Lake Shore Boulevard West Toronto, Ontario (CRA, 2013)
- Phase 2 Environmental Site Assessment, 2150 Lake Shore Boulevard West Toronto, Ontario (CRA, 2013)
- Phase 2 Environmental Site Assessment, 2150 Lake Shore Boulevard West Toronto, Ontario (SPL, 2013)
- Preliminary Geotechnical Investigation, 2150 Lake Shore Boulevard West Toronto, Ontario (Golder, 2015).
- Phase 2 Environmental Site Assessment, 2150 Lake Shore Boulevard West Toronto, Ontario (Golder, 2015)
- Phase Two Conceptual Site Model, Technical Memorandum, 2150 Lake Shore Boulevard West, Toronto, Ontario (Golder, 2019)

Table 2 below, summarizes the boreholes that have been taken from the above-mentioned documents in order to aid in preliminary determination of the site-specific geological and hydrogeological conditions.

Table 2 - Summary of Site-Specific Ground Investigation Reports

Date	Source	Document Type	Relevant Boreholes and Test Pits
February 2013	Conestoga-Rovers & Associates	Preliminary Geotechnical Investigation, 2150 Lake Shore	MW1-13, MW2-13, MW3-13, MW4-13, MW5-13, MW6-13, MW7-13, MW8-13, MW9-13

Date	Source	Document Type	Relevant Boreholes and Test Pits
		Boulevard West Toronto, Ontario	
February 2013	Conestoga-Rovers & Associates	Phase 1 Environmental Site Assessment, 2150 Lake Shore Boulevard West Toronto, Ontario	BH2-04, BH3-04, BH4-04, BH5-04, BH6-04, BH7-04, BH8-04, BH9-04, BH10-04, BH11-04, BH1, BH2, MW1-04, MW2-04, MW3-04, MW5-04, MW6-04, BH201-05, BH202-05, BH203-05, BH204-05 and BH205-05
July 2013	Conestoga-Rovers & Associates	Phase 2 Environmental Site Assessment, 2150 Lake Shore Boulevard West Toronto, Ontario	BH1-13, BH2-13, BH3-13, BH4-13, BH5-13, BH6-13, BH101-13, BH102-13, BH103-13, BH104-13, BH105-13, BH106-13, BH107-13, BH108-13, BH109-13, BH110-13, BH111-13, BH112-13, BH113-13, BH114-13, BH201-13, BH202-13, BH203-13, BH204-13, BH205-13, BH206-13, BH207-13, BH208-13, BH209-13, BH210-13, BH211-13, BH212-13
December 2013	SPL Consultants	Phase 2 Environmental Site Assessment, 2150 Lake Shore Boulevard West Toronto, Ontario	BHI-1, BHI-2, BHI-3, BHI-4, BHI-5, BHI-6, BHI-7, BHI-8, BHI-9A, BHI-10, BHI-11, BHI-12, BHI-13, BH1, BH2, BH3, BH4, BH5, BH6, BH7, BH8, BH9, BH10, BH11, BH12, BH13, BH14, BH15, BH16, BH17, BH18, BH19, BH20, BH21, BH22, BH23, BH24, BH25, BH26, BH27, BH28, BH29, BH30, BH31, BH32, BH33, BH34, BH35, BH36, BH37, BH38, BH39, BH40, BH41, BH42, BH43, BH44, BH45, BH46, BH47, BH48, BH49, BH50, BH51, BH52, BH53, BH54, BH55, BH56, BH57, BH58, BH59, BH60, BH61, BH62, BH63, BH64, BH65, BH66, BH67, BH68
January 2015	Golder Associates	Preliminary Geotechnical Investigation, 2150 Lake Shore Boulevard West Toronto, Ontario	BH15-1, BH15-2, BH15-3, BH15-4, BH15-5
January 2015	Golder Associates	Phase 2 Environmental Site	MW14-1, MW14-3, MW14-4, MW14-5 MW14-6, MW14-7

Date	Source	Document Type	Relevant Boreholes and Test Pits
		Assessment, 2150 Lake Shore Boulevard West Toronto, Ontario	

3.3 Summary of Strata

The ground and groundwater conditions at the site are interpreted from the site-specific reports and available borehole/well records from within the site. The historical reports from the surrounding area, including adjacent sites, are considered as supporting information, which have been reviewed to confirm the interpreted ground and groundwater conditions and, to identify any potential unfavourable ground conditions not identified from investigations within the site.

Fill

Fill (including topsoil and asphalt) was recorded in the majority of the boreholes within the site. The fill was typically recorded as loose to compact silty sand and sand and gravel, and/or firm to stiff silty clay, with occasional traces of rootlets in the upper 2 m. Fill was typically recorded from ground surface to 2.6 mbgs (+81.36 masl), but up 6.6 m and 10.8 m (+81.29 masl) where associated with the fill slope to the north of the site. Mean average thickness was 2.3 m.

Old Lake Deposits

Old Lake Deposits were recorded in the majority of the boreholes within the site. The old lake deposits were typically recorded as firm to very stiff, silty clay and sandy silt, occasionally silty sand. Old lake deposits were typically recorded between 2.6 m and 7.4 m depth (+81.36 masl and +77.5 masl), but occasionally up to 12 m depth (+75.06 masl). A mean average thickness of 5.7 m was recorded.

Till

Till was recorded intermittently in boreholes within the site. Where encountered the glacial till was typically recorded as very stiff to hard, clayey silt with sand and gravel. Where encountered, depth of till was typically recorded between 6.5 m and 8.0 m (+80 masl and +77.5 masl). A mean average thickness of 3.0 m was recorded.

Shale Bedrock

Shale bedrock was encountered in the majority of the boreholes. The shale was frequently recorded as clay shale with occasional weathered and/or fractured in the upper 0.3 m to 1.2 m. Beyond the upper weathered/fractured zone, RQD values are typically recorded between 50% and 90%, but also ranging from 0% to 100%. Depth to shale bedrock (including the weathered/fractured zone) was recorded between 4.1 m and 15.0 m below ground, with a mean average depth of 7.7 m.

Elevation of shale bedrock was 70.7 masl and 82.6 masl, with a mean average of 78.2 masl.

4 Physical Hydrology

4.1 Hydraulic Conductivity

Table 3, below, presents anticipated permeability values based on descriptions within boreholes legs, available particle size distribution data, and experience of similar ground conditions in the area.

Table 3 - Anticipated Permeability

Strata	Anticipated Strata Thickness (m)	Typical Hydraulic Conductivity (m/s)
Fill	2.3	$1x10^{-6}$ to $1x10^{-7}$
Old Lake Deposits (silty clay/clayey silt)	5.5	$1x10^{-7}$ to $1x10^{-8}$
Till (silty clay/clayey silt)	3.0	$1x10^{-9}$ to $1x10^{-8}$
Upper Weathered/Fractured Shale	0.7	$1x10^{-7}$ to $1x10^{-8}$
Shale	>100m*	$1x10^{-10}$ to $1x10^{-8}$

Note:
*Thickness of the shale has not been proven, however the Georgian Bay shale is anticipated to be around 200 m in thickness (Westgate et al., 1999).

Based on the above permeabilities, it is expected that the old lake deposits and till will act as aquitards to the overlying soils. As a result, it is anticipated that perched groundwater will be present within the fill overlying the old lake deposits, and/or within the old lake deposits overlying the till.

4.2 Groundwater Levels

Available groundwater information from existing site-specific reports has been reviewed and is summarized below. Table 4, below, presents the groundwater levels recorded in the site-specific investigation reports listed in Table 2.

Table 4 - Summary of Measured Groundwater Readings

Well ID	Strata Screened	Top of Screen (mbgs)	Bottom of Screen (mbgs)	Measured Groundwater Depth (mbgs)	Measured Groundwater Elevation (masl)	Date of Measurement
MW14-6	Fill/Silt	0.6	2.9	1.28	82.7*	16 Dec 2014
MW14-4	Silty Sand	1.8	3.7	2.63	81.81*	16 Dec 2014
BH1	Silt	6.1	9.1	3.25	-	22 Oct 2004
BH2	Silt/Silty Clay	4.9	7.5	5.45	-	22 Oct 2004
MW1-13	Silt/Silty Clay	2.7	6.4	0.68	84.27	4 Mar 2013
MW3-13	Silt/Silty Clay	3.7	7.3	2.90	81.93	4 Mar 2013
MW6-13	Silt/Silty Clay	3.0	6.7	0.45	85.75	4 Mar 2013
MW9-13	Silt/Silty Clay	2.7	6.4	2.74	81.7	4 Mar 2013
MW7-13	Silty Clay	3.4	7.0	2.52	84.2	4 Mar 2013
MW4-13	Silty Clay/ weathered Shale Bedrock	1.8	5.2	1.44	82.76	4 Mar 2013
MW2-13	Shale Bedrock	12.5	15.4	9.93	71.53	4 Mar 2013
MW8-13	Shale Bedrock	8.5	10.7	7.94	76.04	4 Mar 2013
MW5-13	Shale Bedrock	11.6	15.4	11.53	73.51	4 Mar 2013
BH1	Silt/Sand	1.8	3.7	2.30	81.80	9 Jan 2017
BH11	Silty Clay/ weathered Shale Bedrock	2.8	4.6	1.60	78.87	9 Jan 2017
BH14	Silty Clay/ weathered Shale Bedrock	5.5	7.4	2.30	81.86	9 Jan 2017
BH19	Silty Clay/ weathered Shale Bedrock	6.4	8.2	7.96	75.05	9 Jan 2017
BH32	Silt/Clay	3.7	5.5	2.93	81.80	9 Jan 2017
BH39	Silty Clay/ weathered Shale Bedrock	5.8	7.6	4.14	80.15	9 Jan 2017

Well ID	Strata Screened	Top of Screen (mbgs)	Bottom of Screen (mbgs)	Measured Groundwater Depth (mbgs)	Measured Groundwater Elevation (masl)	Date of Measurement
BH45	Silty Clay/ weathered Shale Bedrock	3.5	4.7	2.26	81.55	9 Jan 2017
BH52	Clayey SILT	5.8	7.0	3.62	82.54	9 Jan 2017
BH57	Clayey SILT	6.4	8.2	4.31	83.16	9 Jan 2017
BH62	Clayey SILT	4.8	6.7	2.52	82.22	9 Jan 2017
BH65	Clayey SILT	4.9	6.7	3.72	80.31	9 Jan 2017
BH68	BH Log does not indicate GW installation	-	-	5.95	78.18	9 Jan 2017
BH8	Silty Clay / weathered Shale Bedrock	4.9	6.7	3.36	80.67	9 Jan 2017
BH9	Silty Clay / Till	4.3	6.1	2.16	80.39	9 Jan 2017
MW1-04	Silt clay FILL / TILL	1.5	4.6	15.17	84.45	9 Jan 2017
MW14-5	sandy SILT / silty CLAY	1.2	4.6	5.28	81.34	9 Jan 2017
MW2-04	SILT	1.5	4.6	15.33	84.32	9 Jan 2017
MW5-04	SILT / Sandy SILT	1.5	4.6	15.57	84.28	9 Jan 2017
MW6-04	FILL / SILT	0.9	4.0	15.43	84.41	9 Jan 2017
MW9-13	Clay-Silt	2.7	6.4	2.93	81.51	9 Jan 2017

Notes:

* Indicates that no surface elevation was provided with the borehole log, and this has been estimated based on adjacent boreholes.

Where elevation could not be estimated a '-' is indicated.

The groundwater monitoring data presented above shows monitoring installations within surficial soils and bedrock. From within the soils, groundwater depth is recorded between 0.45 m and 2.9 m (Elevations of +85.75 masl +81.7 masl) with a mean average of 1.8 m (+83.1 masl). From within the shale bedrock, groundwater depth is recorded between 7.94 m and 11.53 m (Elevations of +76.04 masl +71.53 masl) with a mean average of 1.8 m (+73.69 masl). This observation of separate groundwater regimes indicates perched groundwater within the surficial soils resulting from low permeability soil units slowing infiltration to reach the water table below.

4.3 Groundwater Flow

Given the anticipated low permeability of both the superficial deposits and bedrock at the site, groundwater flow is likely to be limited.

It is anticipated that regional groundwater flow will be largely controlled by Lake Ontario to the southeast and locally influenced by Mimico Creek towards the southwest. At present, no long-term groundwater monitoring is available, however Golder's Phase 2 Conceptual Site Model (2019) provides mapped groundwater contours at the site based on their recorded of groundwater levels. These groundwater contours are shown in Figure 3 below and show groundwater flow in a southeasterly direction through the surficial deposits towards Lake Ontario.

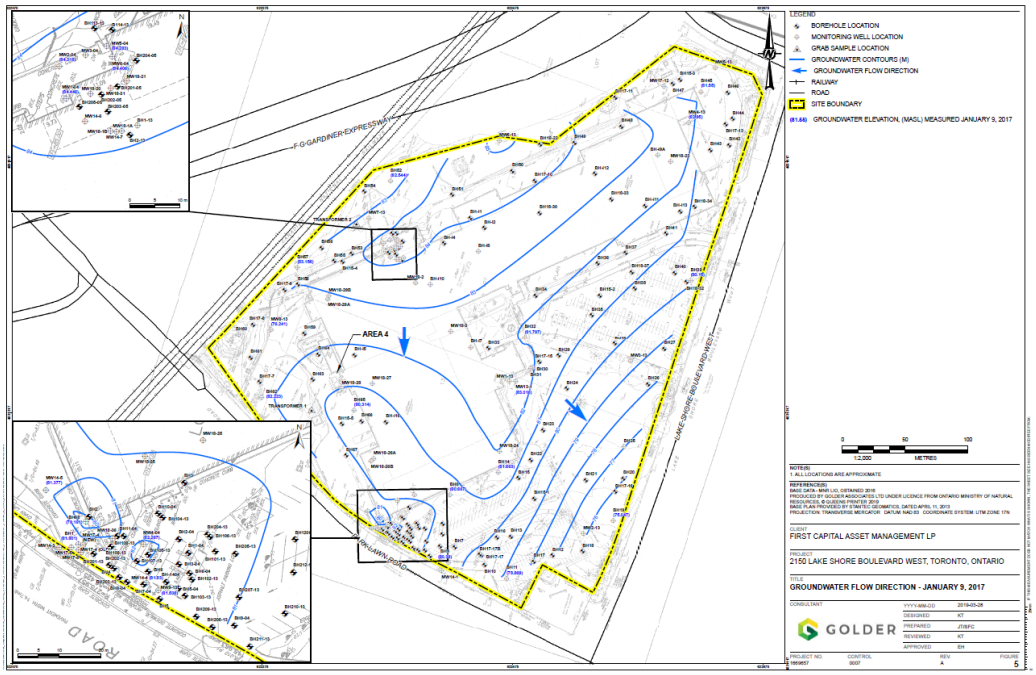


Figure 3 Groundwater contours (January 2017) extracted from Golder (2019).

4.4 Pumping Tests

Although pumping tests have not been carried out at the time of writing this report, an analytical assessment of anticipated groundwater discharge from basements has been carried out in order to estimate discharge volumes. Results of the assessments are presented in Section 5.

4.5 Groundwater Quality

A review of historical information has indicated that the site has had a number of historical land uses. 2150 Lake Shore Boulevard West was historically used as farmland. Within the site there have been five brickyards operating, the largest until

the 1930s, making bricks from local sandy clay. Other early industries included Carson Cement Block and Humber Coal and Supply. Environmental Assessments for the site (Golder, 2019) also highlighted past land uses with potentially contaminating activities that included use or storage of the following: solvents, sulphuric acid, hydrocarbons, PCBs, and metals. The site has also been used for storage of ammunition from World War II and as a sanitary landfill.

Following demolition of the Cookie factory structure, soil remediation was carried out in 2018 to target a number of identified contaminants, whilst further delineation of remaining contaminants was carried out. Remediation included excavation and removal of identified 'hot spots' and disused storage tanks. Groundwater quality testing was carried out as part of the Environmental Site Assessment and noted that the reported concentrations for contaminants discussed above were subsequently within applicable site condition standards (Golder, 2019).

The City of Toronto Sewers By-Law (Municipal Code, Chapter 681) sets limits on what can be discharged into the sewer system (Table 1 – Limits for Sanitary and Combined Sewers Discharge; and Table 2 – Limits for Storm Sewer Discharge). Although this information is not currently available for the site, further groundwater quality sampling and testing for the purpose of groundwater discharge will be carried out as part of further investigation at the site. This data can be provided to the City of Toronto if required.

5 Groundwater Extraction and Discharge

5.1 Proposed Basements

Figure 4 below presents the current basement layout with different phases shown. It is currently understood that the basements will be formed using perimeter secant pile walls and basement slabs with permanent drainage. The use of a secant pile wall is expected to significantly reduce the volume of groundwater inflow into the basements that will be picked up by a drainage system, allowing for a drained solution rather than permanent groundwater extraction or a fully waterproofed design. The permanent groundwater drainage system will be designed at the detailed design stage. Foundations for the towers are expected to be within the shale bedrock which was encountered between 70.7 masl and 82.6 masl.

Figure 4 - Basement Phase Layout

It is understood at the time of writing this report that basement phases may be excavated sequentially, and therefore not all basements may be excavated at the same time. Because of this, groundwater inflow has been provided for each basement individually, but also for phase 1 to 5 as a single basement for the purposes of long-term consideration. The basement for Phase 6 is considered separately owing to its relative isolation and increased depth.

5.2 Analytical Assessment

At the time of writing this report, pumping tests and long-term groundwater monitoring data was not available. As a result, analytical assessment to determine the volume of groundwater inflow into basements, and therefore groundwater discharge has been carried out based on anticipated permeability values from soil descriptions in borehole logs, particle size distribution data, and experience with similar local ground conditions. The analytical assessment of dewatering has used the equivalent well method as detailed below. For the analysis, groundwater level has been assumed to be 1 m below ground surface.4.1

5.2.1 Effective Radius

In order to determine anticipated groundwater inflow into the basements using analytical methods, the basement footprints must first be converted to an effective radius. This approach is presented by Mansur & Kauffman (1962) and is outlined below.

$$r_e = \sqrt{\frac{ab}{\pi}}$$

Where:

r_e = Effective Radius

a = Width of excavation

b = Length of excavation

Equivalent well radius has been determined for each basement, and for basements 1-5 combined.

Table 5 - Effective Radius

Basement Phase	Measured Perimeter (m)	Effective Radius (m)
Phase 1	502	71
Phase 2	590	83

Basement Phase	Measured Perimeter (m)	Effective Radius (m)
Phase 3	597	84
Phase 4	443	62
Phase 5	365	51
Phase 6	250	35
Phase 1-5	1280	181
Note: the above measured perimeter values discount 'shared perimeter' between different phases (e.g., the shared perimeter between Phase 1 and Phase 3 seen in Figure 4)		

5.2.2 Radius of Influence

Zone of influence has been calculated using the Sichardt method for unconfined aquifers. This method uses an empirical approach based on drawdown and permeability.

$$R_0 = Cs\sqrt{K}$$

Where:

R_0 = Radius of influence

C = Shape factor

s = Drawdown

K = Hydraulic conductivity

Anticipated final formation level above the basements is anticipated to vary between approximately +85.5 masl and +89 masl with the current design of the proposed basements anticipated to vary between approximately +65.5 masl and +73 masl. With consideration for the thickness and permeability of each deposit, characteristic permeability value for the soil within which the basements are to be constructed has been determined for analysis. For the purposes of analysing ground water inflow, boundary elevation was set at +55 m (approximately 10 m below the bottom of the lowest basement).

Based on the above, mean average anticipated permeability for the analyzed area is between 2.0×10^{-8} m/s and 2.0×10^{-7} m/s. Based on recorded groundwater elevations, for the purposes of analysis groundwater was assumed to be 1 m below ground surface. Table 6 presents the maximum radius of influence

Table 6 - Radius of Influence

Basement Phase	Anticipated Groundwater Drawdown within the Excavation (m)	Maximum Radius of Influence (m)
Phase 1	17.5	94
Phase 2	16	104
Phase 3	17.5	107
Phase 4	17	84
Phase 5	14	71
Phase 6	20.5	62
Phase 1-5	16.5	200

It should be noted that the radius of influence has been calculated assuming the groundwater inflow into the basement is through unimpeded strata, and no benefit is taken from the earth retaining structure.

5.2.3 Drainage and Discharge

Anticipated groundwater flow into the basement excavation has been calculated using the approach presented by Mansur and Kauffman (1962) for unconfined aquifers. This method uses an empirical approach based on drawdown with an excavation, hydraulic conductivity, radius of influence, and radius of excavation.

$$Q = \pi K \frac{(H^2 - h_w^2)}{1n\left(\frac{2R_0}{r_w}\right)}$$

Where:

Q = Total discharge

K = Hydraulic conductivity

H = Height of water table at radius of influence

h_w = Height of water table within well (excavation)

R_0 = Radius of influence

R_w = radius of well (excavation)

Based on the above the following discharge volumes have been determined for the case where groundwater is allowed to enter the excavation unimpeded (i.e. no

benefit taken from the anticipated secant pile wall around the boundary of basements).

Table 7 - Anticipated Groundwater Discharge

Basement Phase	Minimum Anticipated Groundwater Discharge (m^3/d) (unfactored)	Maximum Anticipated Groundwater Discharge (m^3/d) (unfactored)	Maximum Anticipated Groundwater Discharge (m^3/d) (factored)
Phase 1	5	47	70
Phase 2	4	41	62
Phase 3	5	49	73
Phase 4	4	38	57
Phase 5	3	34	51
Phase 6	3	34	51
Phase 1-5	21	209	313
Note: Factored groundwater discharge includes a Factor of Safety of 1.5			

In addition to the anticipated groundwater discharge presented above, consideration should be made for large rainfall events that may result in a considerable amount of additional water being required to be pumped from excavations.

5.3 Private Water Drainage Systems

For the proposed development it is understood that current design includes secant pile walls around the perimeter of the basements. This construction technique, although not fully waterproof, is expected to significantly reduce groundwater inflow into the basements and therefore reduce the required discharge of groundwater.

Considering the above construction approach, it is recommended that a sub-floor Private Water Drainage System (PWDS) be included in the design together with perimeter drainage to capture groundwater inflow.

5.4 Groundwater Discharge Assessment

During the construction of the basements it is anticipated that the groundwater level will have to be lowered below the bottom of the proposed excavation. Based on the analysis in the above sections, it is anticipated that for preliminary design purposes of temporary works (i.e., during construction) a factored groundwater discharge is anticipated to range between 51 m^3/d and 73 m^3/d for each basement. Full details are presented in Table 7

Quantifying the volume of groundwater entering the basement with a perimeter secant pile wall in place remains difficult due to the influence of construction quality and detailing during the detailed design stage. However, based on local experience it is recommended that for initial design purposes the PWDS should consider at a minimum 25% of the factored anticipated groundwater discharge presented in Table 7. Results of groundwater discharge considering the benefit of the secant pile perimeter wall are presented in Table 8, below. As design progresses, on-site permeability testing should be carried out to further refine the anticipated groundwater discharge volumes.

Table 8 – Anticipated Groundwater Discharge with Secant Pile Perimeter Wall

Basement Phase	Maximum Anticipated Groundwater Discharge (m^3/d) with Secant Pile Perimeter Wall (factored)
Phase 1	18
Phase 2	15
Phase 3	18
Phase 4	14
Phase 5	13
Phase 6	13
Phase 1-5	78

Note:

Factored groundwater discharge includes a Factor of Safety of 1.5

Above groundwater discharge assumes 25% of factored analysis result due to benefit of secant pile wall.

5.5 Groundwater Permitting

5.5.1 Permit to Take Water

Permit to Take Water (PTTW) requirements for construction site dewatering are set out in the Environmental Protection Act and as amended in O.Reg.63/16 and discussed in the Water Taking Environmental Activity and Sector Registry (EASR) User Guide. In accordance with these regulations two types of PTTW are available:

1. Where anticipated groundwater taking is between 50,000 L/day and 400,000 L/day (50 m^3/day and 400 m^3/day) a PTTW obtained through an online application is required.
2. Where anticipated groundwater taking exceeds 400,000 L/day (400 m^3/day) a full PTTW is required.

The maximum anticipated groundwater discharge during construction activities was estimated to be between 51 m^3/d (51,000 L/d) and 73 m^3/d (73,000 L/d) for

each basement or 364 m^3/d (364,000 L/d) collectively. Therefore, a PTTW obtained through an online application with the MECP is expected to be sufficient.

The maximum anticipated groundwater discharge from the PWDS was estimated to be between 13 m^3/d (13,000 L/d) and 18 m^3/d (18,000 L/d) for each basement or 91 m^3/d (91,000 L/d) collectively. Therefore, a PTTW obtained through an online application with the MECP is expected to be sufficient. It is however recommended that in-situ permeability testing be carried out on site to refine the anticipated groundwater volumes. Records of groundwater discharge during construction phase should also be reviewed in order to verify long term PWDS and PTTW requirements.

5.5.2 Water Discharge Permits

In addition to the PTTW, water discharge permits are required during construction phase and operation phase of the building prior to discharge of any collected groundwater or rainwater into the City sewer system. During construction phase this includes obtained groundwater and collected rainwater, whilst during operation phase, this includes water collected by the PWDS.

A Long-Term Private Water Discharge Approval (LTPWDA) will be required where discharge of water from the PWDS into the sanitary/combined sewer is anticipated. Where granted, this type of approval will need to be renewed yearly. Section 2 and Section 4 of the Toronto Municipal Code Chapter 681 Sewers details requirements for discharge approval.

5.6 Review of Taking and Discharging Impacts

A review of the impacts of groundwater taking and discharge on the natural environmental and City sewage works has been carried out. Anticipated volumes of water to be taken and discharged are presented in the above sections, and fall within requirements for City permitting (PTTW and LTPWDA). As discussed in Section 4.5 groundwater quality sampling and testing for the purpose of groundwater discharge will be carried out as part of further investigation at the site. This data can be provided to the City of Toronto if required.

The site is located within the Humber Bay area between the Humber River approximately 800 m to the northeast, and Mimco Creek, approximately 210 m to the southwest, roughly parallel but beyond Park Lawn Road. Lake Ontario is located approximately 250 m to 300 m to the south. Table 6 presents the anticipated radius of influence resulting from taking water and indicates that all surface water features re located beyond the radius of influence.

Based on the available information, an initial review indicates that settlement of the surrounding area resulting from taking over water is expected to be insignificant – in part because of the shallow depths to rock and in part because of the existing soil

conditions. Detailed assessment will be carried out during further design stages of the project.

6 Proposed Mitigation and Monitoring

A monitoring and mitigation plan will be required prior to commencement of construction dewatering. It is anticipated that this plan will be developed in conjunction with the dewatering contractor, and will involve:

- Monitoring of background water levels at the site, either by using existing groundwater monitoring boreholes or by installing new wells.
- Identification of sensitive receptors, including offsite groundwater abstractions and sensitive structures (buildings, infrastructure, major utilities, etc.).
- Installation of groundwater monitoring wells and instrumentation to monitor ground movements, where appropriate, between the dewatering site and sensitive receptors.
- Setting trigger and action levels these monitoring points.
- Developing mitigation plans outlining how to control or mitigate against excessive drawdown, for example by recharging groundwater.

7 Summary and Further Work

This hydrological review has been prepared in accordance with the requirements for a Hydrological Review set out by the City of Toronto.

The current Master Plan features a range of land uses including a new public park, and a diverse mix of residential, retail, service, entertainment and employment uses and a range of building types. Fifteen towers are proposed on the site with heights ranging from 16 to 70 storeys. The current Master Plan includes 6 phases, each of which includes a basement ranging from 3 to 5 levels to a minimum basement slab elevation of +65.5 masl (approximately 20 mbgs).

Analysis of groundwater discharge has been carried out for each individual development phase (1 to 6) and collectively for phases 1 to 5. The initial analysis has been carried out using available data as discussed in this report and considers an open excavation (Table 7). Assumptions have been made regarding the benefit of the proposed secant pile perimeter wall and the associated reduction in groundwater discharge based on local experience (I.e. a minimum of 25% of discharge without the secant pile perimeter wall). These results are presented in

Table 8 and show groundwater discharge ranging from 13 to 18 m^3/day for individual development phases.

Based on the current design approach for the basements – secant pile perimeter walls – a Private Water Drainage System (PWDS) including drainage below the basement floor and perimeter drainage is suitable.

This report is based on previous ground investigation work carried out at the site and a review of historical records within and surrounding the site. Although ground investigations have been carried out within the site, ground investigation has yet to be completed specifically for the current proposed development. As a result, analysis in this report is based on available field and lab testing and does not include data obtained from slug tests, pumping tests, or long-term groundwater monitoring. Gaps in the available data for further design stages will be addressed by further site investigation and analysis. The results of these further investigations can be provided to the City of Toronto if required.

References

City of Toronto. Hydrological Review Summary (https://www.toronto.ca/wp-content/uploads/2018/08/97bb-Hydrological-Review-August-2018.pdf).

Government of Canada – Fisheries and Oceans Canada. Lake Ontario Historical Water Levels (http://www.tides.gc.ca/C&A/network_means-eng.html).

Ontario Geological Survey, (1980). Quaternary Geology of Toronto and the Surrounding Area. Ministry of Natural Resources Ontario

Preliminary Geotechnical Investigation, 2150 Lake Shore Boulevard West Toronto, Ontario (CRA, 2013)

Phase 1 Environmental Site Assessment, 2150 Lake Shore Boulevard West Toronto, Ontario (CRA, 2013)

Phase 2 Environmental Site Assessment, 2150 Lake Shore Boulevard West Toronto, Ontario (CRA, 2013)

Phase 2 Environmental Site Assessment, 2150 Lake Shore Boulevard West Toronto, Ontario (SPL, 2013)

Preliminary Geotechnical Investigation, 2150 Lake Shore Boulevard West Toronto, Ontario (Golder, 2015).

Phase 2 Environmental Site Assessment, 2150 Lake Shore Boulevard West Toronto, Ontario (Golder, 2015)

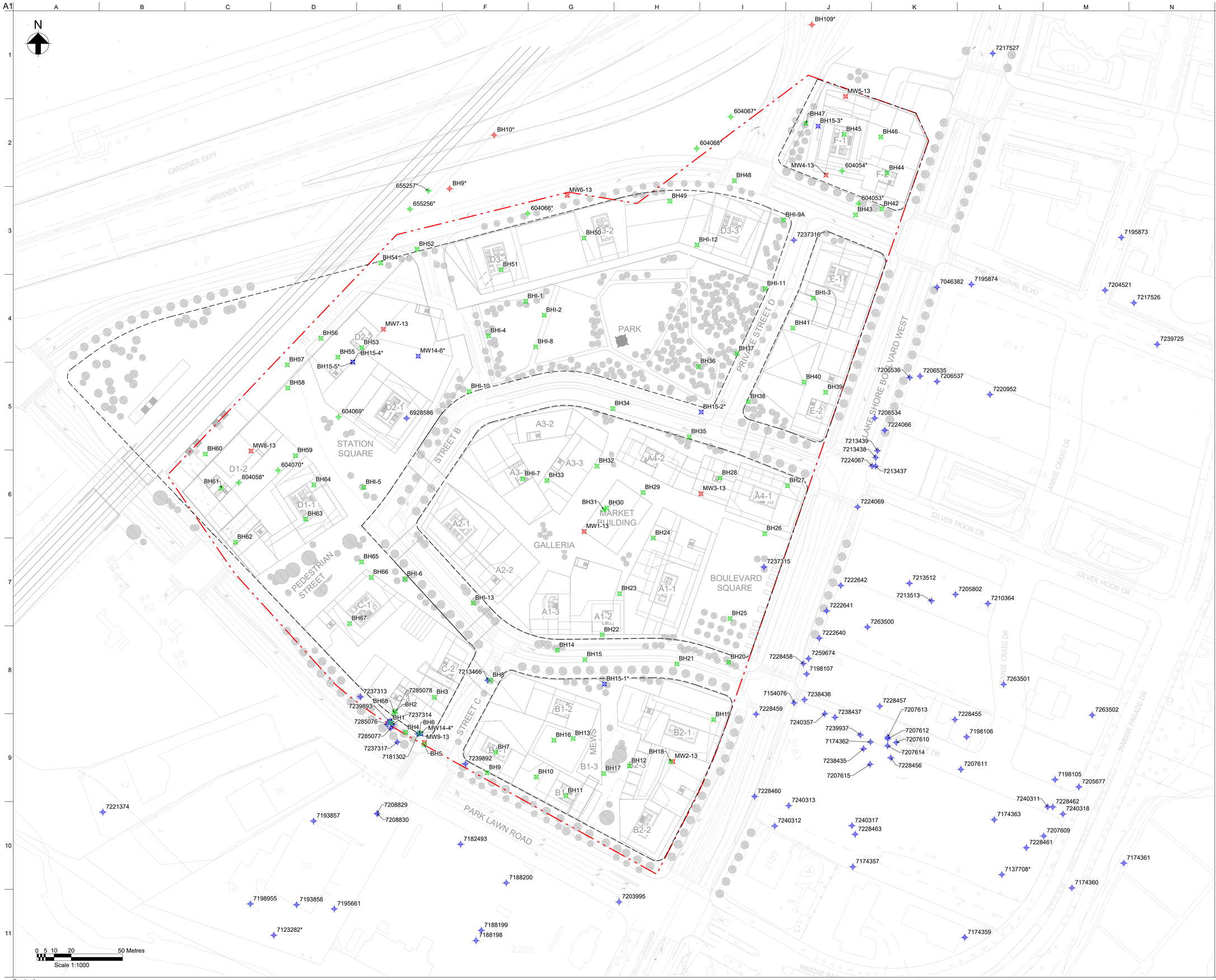
Phase Two Conceptual Site Model, Technical Memorandum, 2150 Lake Shore Boulevard West, Toronto, Ontario (Golder, 2019)

Toronto Transportation Commission, (1921). Contour Map of Toronto District,

Westgate. J.A., von Bitter, P.H., Eyles, N., McAndrew. J.H., Timmer. V., Howard. K.W.F., (1999). Physical Setting: A Story of Changing Environments Through Time. In: Special Places: The Past, Present, and Future of the Ecosystems of the Toronto Region. Royal Canadian Institute. University of British Columbia Press pg 10-31.

Appendix A

Borehole Location Plan



Notes

1. All coordinates are in metres and referenced to Zone 10 of the Ontario Coordinate System, NAD (North American Datum) 1927, 1968 adjustment, 3 degree MTM (NAD 27 MTM 3 degrees Zone 10).
2. All dimensions are in metres unless noted otherwise.
3. This drawing represents 3rd party data and it has been produced for information only, to orientate the geotechnical and hydrological studies for this development.

Legend

- Site Boundary
- Borehole Location Source: Golder (2014)
- Borehole Location Source: CRA (2013)
- Borehole Location Source: SPL (2013)
- Borehole Location Source: MTO Foundations Library
- Borehole Location Source: Ontario Well Database
- Borehole Location Source: Ontario Geotechnical Boreholes Database

NOTE:
THIS DRAWING CONTAINS EXTENSIVE USE OF COLOUR LINE WORK AND MUST BE PLOTTED IN COLOUR.

Rev	Date	By	Chkd	Appd
01	15/05/20	AR	LS	HJ

For planning submission

ARUP

Arup Canada Inc.
121 Bloor Street East
Suite 900
Toronto ON M4W 3M5
Canada
www.arup.com

Client
FCR (Park Lawn) LP and CPPIB Park Lawn Canada Inc.

Project Title
2150 Lake Shore

Drawing Title
Borehole Location Plan

Scale at A1: 1:1000

Role: Geotechnics

Suitability: Detailed Masterplan

Arup Job No: **264635**

Rev: **01**

Name: **LSB-ARP-XX-XX-DR-GE-10000**

Do not scale

© Arup

Appendix B

Relevant Borehole Logs

RECORD OF BOREHOLE: 15-1

PROJECT: 1417422
LOCATION: As Per Figure 2
BORING DATE: January 5, 2015
SHEET 1 OF 1
DATUM: -
HAMMER TYPE: AUTOMATIC
SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE – DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES – NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE							
0	Power Auger; 70 mm I. D. Hollow Stem Augers	ASPHALT		0.00					
		FILL - (SP/GP) SAND and GRAVEL, some silt, asphalt fragments; dark brown; non-cohesive, moist, compact		0.13	1	SS	12		
1		FILL - (CL) SILTY CLAY, some sand, trace organics rootlets, cohesive, w<PL, firm to stiff		0.61	2	SS	7		
					3	SS	10		
2		(CL) sandy SILTY CLAY, trace to some gravel; brown, turning grey (TILL); cohesive, w<PL to w~PL, stiff to very stiff		2.13	4	SS	17		
3					5	SS	11		
4					6	SS	10		
5		(CI) SILTY CLAY, some sand, some gravel; grey (TILL); cohesive, w~PL, firm		5.49	7A	SS	4	MH	
6		Highly weathered, grey SHALE Bedrock		6.50	7B				
		END OF BOREHOLE		6.60					
7		NOTE: 1. Borehole open and dry at completion of drilling.							
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20, 40, 60, 80)
SHEAR STRENGTH Cu, kPa (20, 40, 60, 80) — nat V. + Q - ● ; rem V. ⊕ U - ○
HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6}, 10^{-5}, 10^{-4}, 10^{-3})
WATER CONTENT PERCENT (10, 20, 30, 40) — Wp ⊢—○W—⊣ Wl

DEPTH SCALE 1 : 50
Golder Associates
LOGGED: BC/SR
CHECKED: JET

RECORD OF BOREHOLE: 15-2

PROJECT: 1417422
LOCATION: As Per Figure 2
BORING DATE: January 5. 2015
SHEET 1 OF 1
DATUM: -
HAMMER TYPE: AUTOMATIC
SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE – DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES – NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE							
0	Power Auger; 70 mm I. D. Hollow Stem Augers	ASPHALT		0.00					
		FILL - (SP/GP) SAND and GRAVEL, trace silt; grey; non-cohesive, moist, loose		0.15	1A	SS	4		
				0.46	1B				
		(CL) sandy SILTY CLAY, trace to some gravel; brown (TILL), with sand seams brown; cohesive, w<PL, stiff to very stiff							
1					2	SS	21		
					3	SS	25		
2									
					4	SS	16		
3									
					5	SS	17		
4									
					6A	SS	9		
5		- Becoming grey at a depth of 4.8 m			6B				
6					7	SS	50/0.08		
		Highly weathered, grey SHALE Bedrock		6.32					
7									
					8	SS	50/0.08		
8		END OF BOREHOLE		7.75					
		NOTE: 1. Borehole open and dry at completion of drilling.							
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20, 40, 60, 80)
SHEAR STRENGTH Cu, kPa (20, 40, 60, 80) — nat V. + Q - ● ; rem V. ⊕ U - ○
HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6}, 10^{-5}, 10^{-4}, 10^{-3})
WATER CONTENT PERCENT (10, 20, 30, 40) — Wp ⊢—○W—⊣ Wl

DEPTH SCALE 1 : 50
Golder Associates
LOGGED: BC
CHECKED: JET

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RECORD OF BOREHOLE: 15-3

PROJECT: 1417422
LOCATION: As Per Figure 2
BORING DATE: January 5, 2015
SHEET 1 OF 1
DATUM: -
HAMMER TYPE: AUTOMATIC
SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕; Q - ●, U - ○)	HYDRAULIC CONDUCTIVITY, k, cm/s	WATER CONTENT PERCENT (Wp, W, Wl)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE											
0	Power Auger, 70 mm I. D. Hollow Stem Augers	ASPHALT		0.00									
		FILL - (SP/GP) SAND and GRAVEL, some silt; brown; non-cohesive, moist, compact		0.10	1	SS	27						
		(CL) sandy SILTY CLAY, some gravel; brown (TILL); cohesive, w<PL, stiff to very stiff		0.61	2	SS	13						
1					3	SS	26						
2					4	SS	26						
3					5	SS	25						
4		- Becoming grey at a depth of 4.0 m			6A	SS	42						
5		Highly weathered, grey SHALE Bedrock		4.93	6B								
6					7	SS	50/ 0.05						
		END OF BOREHOLE		6.30									
7		NOTE: 1. Water level measured at 6.3 m below ground surface at the completion of drilling.											
8													
9													
10													

DEPTH SCALE 1 : 50
Golder Associates
LOGGED: BC
CHECKED: JET

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RECORD OF BOREHOLE: 15-4

PROJECT: 1417422
LOCATION: As Per Figure 2
BORING DATE: January 5. 2015
SHEET 1 OF 1
DATUM: -
HAMMER TYPE: AUTOMATIC
SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕; Q - ●, U - ○)	HYDRAULIC CONDUCTIVITY, k, cm/s	WATER CONTENT PERCENT (Wp, W, Wl)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE											
0	Power Auger, 70 mm I. D. Hollow Stem Augers	ASPHALT		0.00									
		FILL - (SP/GP) SAND and GRAVEL, some silt, asphalt fragments; grey to black; non-cohesive, moist, compact		0.10	1A, 1B	SS	10						
		FILL - (CL) SILTY CLAY, trace sand and gravel, cohesive, w~PL, firm		0.76	2	SS	7						
1		(ML/CL) CLAYEY SILT to SILTY CLAY, trace sand, with frequent sand and silt seams; brown; cohesive, w>PL, firm		1.37	3	SS	8						
2					4	SS	4					MH	
3		- Becoming grey at a depth of 3.0 m			5	SS	4						
4					6A, 6B	SS	50/ 0.10						
5		Highly weathered, grey SHALE Bedrock		4.72									
6					7	SS	50/ 0.10						
		END OF BOREHOLE		6.20									
7		NOTE: 1. Water level measured at 2.1 m below ground surface at the completion of drilling.											
8													
9													
10													

DEPTH SCALE 1 : 50
Golder Associates
LOGGED: BC/SR
CHECKED: JET

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RECORD OF BOREHOLE: 15-5

PROJECT: 1417422
LOCATION: As Per Figure 2
BORING DATE: January 5, 2015
SHEET 1 OF 1
DATUM: -
HAMMER TYPE: AUTOMATIC
SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE – DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE							
0	Power Auger, 70 mm I. D. Hollow Stem Augers	ASPHALT		0.00					
		FILL - (SP/GP) SAND and GRAVEL, some silt; grey to brown; non-cohesive, moist, compact		0.10	1A	SS	13		
		(ML/CL) CLAYEY SILT to SILTY CLAY, trace sand, with sand and silt seams; brown; cohesive, w<PL to w>PL, very soft to firm		0.46	1B				
1					2	SS	6		
2					3	SS	6	MH	
3		- Becoming grey at a depth of 3.0 m			4	SS	6		
					5	SS	9		
5					6	SS	WH		
		Highly weathered, grey SHALE Bedrock		5.49					
6					7	SS	50/0.03		
		END OF BOREHOLE		6.27					

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20, 40, 60, 80)
SHEAR STRENGTH Cu, kPa (20, 40, 60, 80): nat V. + Q - ●; rem V. ⊕ U - ○
HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6}, 10^{-5}, 10^{-4}, 10^{-3})
WATER CONTENT PERCENT: Wp ⊢—○W—⊣ Wl (10, 20, 30, 40)

NOTE:

1. Water level measured at 5.0 m below ground surface at the completion of drilling.

DEPTH SCALE 1 : 50
Golder Associates
LOGGED: BC/SR
CHECKED: JET

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RECORD OF BOREHOLE: MW14-4

PROJECT: 1417422
LOCATION: N ; E
BORING DATE: December 10, 2014
SHEET 1 OF 1
DATUM:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE – DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE							
0	Truck Mount Geo Probe 7822 PT, 50 mm D.O. Steel Casing	Hydrovacuumed		0.00					Concrete; SAND
1									Bentonite
2									Sand
3		(SM) Silty SAND; brown-grey; cohesive, moist, compact		2.44	1	DO			Screen
					2	DO			
4		END OF BOREHOLE		3.96					

HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [%LEL] ⊕ (20, 40, 60, 80)
HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (20, 40, 60, 80)
ND = Not Detected
HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6}, 10^{-5}, 10^{-4}, 10^{-3})
WATER CONTENT PERCENT: Wp ⊢—○W—⊣ Wl (10, 20, 30, 40)

1. Groundwater level was measured at 2.63 m below ground surface on December 16, 2014.

DEPTH SCALE 1 : 50
Golder Associates
LOGGED: EW
CHECKED:

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RECORD OF BOREHOLE: MW14-5

PROJECT: 1417422
LOCATION: N ; E
BORING DATE: December 10, 2014
SHEET 1 OF 1
DATUM:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [%LEL] / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] (ND = Not Detected)	HYDRAULIC CONDUCTIVITY, k, cm/s / WATER CONTENT PERCENT (Wp, W, Wl)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Truck Mount Geo Probe 7822 PT, 50 mm D.O. Steel Casing	Hydrovac (no sampling)		0.00							Concrete
1											Bentonite
2											Sand
3		(ML) Sandy SILT, trace clay; brown to grey; moist		3.05	1	DO	-	ND			Screen
4		(CI) SILTY CLAY, trace sand; grey-brown; wet		3.81	2	DO	-				
				4.57							

DEPTH SCALE 1 : 50

Golder Associates

LOGGED: EW
CHECKED:

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RECORD OF BOREHOLE: MW14-6

PROJECT: 1417422
LOCATION: N ; E
BORING DATE: December 11, 2014
SHEET 1 OF 1
DATUM:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [%LEL] / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] (ND = Not Detected)	HYDRAULIC CONDUCTIVITY, k, cm/s / WATER CONTENT PERCENT (Wp, W, Wl)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Truck Mount Geo Probe 6620 PT, 305 mm D.O. Steel Casing	CONCRETE		0.00							Concrete
		FILL - (SM) SAND, with silt; grey; wet		0.20	1	DO	-	ND			Bentonite
1					2	-	-	ND			Sand
					3	DO	-				
2					4	DO	-	ND			Screen
		(SC) SILT, some clay, trace sand; grey; non-cohesive, wet		2.44	5	DO	-	ND			
3					6	DO	-	ND			
4		END OF BOREHOLE		3.66							

1. Groundwater Level was measured at 1.28 m below ground surface on December 16, 2014.

DEPTH SCALE 1 : 50

Golder Associates

LOGGED: EW
CHECKED:

GTA-BHS 001 S:\CLIENTS\FCAM\2150_LAKESHORE_TORONTO\02_DATA\GINT\1417422.GPJ GAL-MIS.GDT 1/21/15

PROJECT: 1417422
LOCATION: N ; E

RECORD OF BOREHOLE: MW14-7

BORING DATE: December 11, 2014

SHEET 1 OF 1
DATUM:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE – DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES – NUMBER	TYPE	BLOWS/0.3m	HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [%LEL] (ND = Not Detected)	HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] (ND = Not Detected)	HYDRAULIC CONDUCTIVITY, k, cm/s	WATER CONTENT PERCENT (Wp – W – Wl)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE											
0	Wheel Mounted Geo Probe 420 m 305 mm D.O. Steel Casing	CONCRETE		0.00									Concrete
		FILL - (SW) SAND, some silt; brown with grey; moist		0.30	1	DO	-	ND					Bentonite
		(MH) SILT, some clay, trace sand; grey; cohesive, moist		0.61	2	DO	-						Sand
1					3	DO	-	ND					
2					4	DO	-	ND					Screen
3					5	DO	-	ND					
					6	DO	-	ND					
4		END OF BOREHOLE		3.66									
5													
6													
7													
8													
9													
10													

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: EW
CHECKED:

GTA-BHS 001 S:\CLIENTS\FCAM\2150_LAKESHORE_TORONTO\02_DATA\GINT\1417422.GPJ GAL-MIS.GDT 1/12/15

REFERENCE No.: 081211

ENCLOSURE No.: 1

BOREHOLE No.: MW1-13
ELEVATION: 84.95 m

BOREHOLE REPORT

Page: 1 of 2

CLIENT: Mondelez Canada Inc.
PROJECT: Preliminary Geotechnical Investigation
LOCATION: 2150 Lake Shore Blvd. West, Toronto
DESCRIBED BY: K. Vander Meulen
CHECKED BY: S. Shahangian
DATE (START): January 28, 2013
DATE (FINISH): January 28, 2013

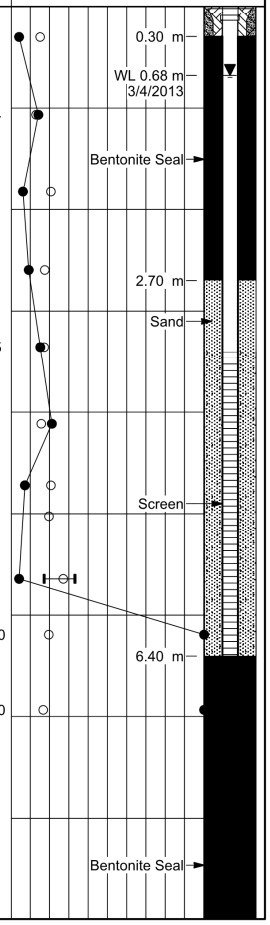
LEGEND

- PQ - PQ size continue coring
- ST - SHELBY TUBE
- RC - ROCK CORE
- WATER LEVEL

Depth (bgs) Feet	Metres	Elevation (m) 84.95	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery %	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index/SCR N
				GROUND SURFACE						
	0.10	84.85		TOPSOIL : 100 mm						
				SP-SAND (FILL), very loose, fine grained, poorly graded, brown, moist		SS-1	80	15	2-2-2-3	4
	0.76	84.19		CL-SILTY CLAY, stiff, grey, moist		SS-2	62	13	6-7-7-8	14
				firm, very moist		SS-3	50	21	6-3-3-3	6
	2.29	82.66		ML-SILT, trace clay, loose, light brown, moist		SS-4	100	17	3-3-6-7	9
				compact		SS-5	100	17	5-6-9-11	15
						SS-6	80	16	5-7-14-14	21
						SS-7A	50	21	3-3-4-4	7
	4.88	80.07		CL-SILTY CLAY, firm, grey, moist		SS-7B		20		--
				trace sand, soft, wet Gr : 0%, Sa : 5%, Si : 50%, Cl : 45%		SS-8	100	27	2-2-2-2	4
	6.10	78.85		SHALE (GEORGIAN BAY FORMATION), highly to completely weathered (inferred), with clay, grey		SS-9	30	19	100/ 150mm	100
						SS-10	30	17	100/ 150mm	100
	7.32	77.63		SHALE (GEORGIAN BAY FORMATION), with interbedded limestone, siltstone, fissile, thinly-bedded to thinly laminated, grey		RUN-1	80	--	26	--
						RUN-2	90	--	50	--

Shear test (Cu) △ Field
Sensitivity (S) □ Lab
○ Water content (%)
W_p W_l Atterberg limits (%)
● "N" Value (blows / 12 in.-30 cm)

10 20 30 40 50 60 70 80 90



SOIL LOG WITH GRAPH+WELL 081211-INSCRA.GPJ INSPEC_SOL.GDT 3/12/13

REFERENCE No.: 081211 ENCLOSURE No.: 1

BOREHOLE No.: MW1-13
ELEVATION: 84.95 m

BOREHOLE REPORT

CLIENT: Mondelez Canada Inc.
PROJECT: Preliminary Geotechnical Investigation
LOCATION: 2150 Lake Shore Blvd. West, Toronto
DESCRIBED BY: K. Vander Meulen CHECKED BY: S. Shahangian
DATE (START): January 28, 2013 DATE (FINISH): January 28, 2013

LEGEND
- PQ - PQ size continue coring
- ST - SHELBY TUBE
- RC - ROCK CORE
- WATER LEVEL

Depth (bgs) Feet	Depth (bgs) Metres	Elevation (m) 84.95	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery %	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index/SCR N
				GROUND SURFACE						
				100 mm of highly fractured rock with clay at 8.92 m depth		RUN-3	100	--	62	--
	10.52	74.43		END OF BOREHOLE ● Borehole terminated at 10.52 m bgs ● Borehole dry to 7.3 m bgs ● 'bgs' denotes below ground surface ● Gr, Sa, Si and Cl denotes Gravel, Sand, Silt and Clay respectively Ground Water Measurements : (Surface elevation : 84.95 m) Date Depth (m) Elev. (m) 3/4/2013 0.68 84.27						

Shear test (Cu) △ Field
Sensitivity (S) □ Lab
○ Water content (%)
Atterberg limits (%)
● "N" Value (blows / 12 in.-30 cm)

10 20 30 40 50 60 70 80 90

10.52 m

SOIL LOG WITH GRAPH+WELL 081211-INSCRA.GPJ INSPEC_SOL.GDT 3/12/13

REFERENCE No.: 081211 ENCLOSURE No.: 2

BOREHOLE No.: MW2-13
ELEVATION: 81.46 m

BOREHOLE REPORT

CLIENT: Mondelez Canada Inc.
PROJECT: Preliminary Geotechnical Investigation
LOCATION: 2150 Lake Shore Blvd. West, Toronto
DESCRIBED BY: K. Vander Meulen CHECKED BY: S. Shahangian
DATE (START): January 29, 2013 DATE (FINISH): January 29, 2013

LEGEND
- PQ - PQ size continue coring
- ST - SHELBY TUBE
- RC - ROCK CORE
- WATER LEVEL

Depth (bgs) Feet	Depth (bgs) Metres	Elevation (m) 81.46	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery %	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index/SCR N
				GROUND SURFACE						
	0.08	81.38		ASPHALT : 75 mm						
				ML-SILT, some clay, very loose, light brown, moist		SS-1	100	20	6-2-2-3	4
	0.91	80.55		CL-SILTY CLAY, trace sand, stiff, low plasticity, grey, moist Gr : 0%, Sa : 4%, Si : 81%, Cl : 15%		SS-2	62	20	3-5-6-8	11
						SS-3	100	17	2-2-6-8	8
						SS-4	100	17	3-5-8-8	13
						SS-5	100	16	4-5-8-9	13
	3.81	77.65		ML-SILT, trace clay, compact, grey, moist		SS-6	100	17	4-6-7-9	13
	4.88	76.58		CL-SILTY CLAY, trace sand and gravel, stiff, plastic, grey, moist soft, very moist to wet		SS-7	62	15	2-4-6-6	10
						SS-8	62	24	3-1-3-2	4
	6.40	75.06		SHALE (GEORGIAN BAY FORMATION), highly to completely weathered (inferred). grey. very moist to wet		SS-9	75	5	3-11-44-67	55
	6.86	74.60		SHALE (GEORGIAN BAY FORMATION), with interbedded limestone,siltstone, fissile, thinly-bedded to thinly laminated, grey 0.3 m highly fractured rock (horizontal & vertical fractures) at 6.89 m depth 25.4 mm clay seam at 7.16 m depth 50 mm vertical fracture at 7.32 m depth 50 mm fracture with clay at 7.37 m depth 50 mm vertical fracture at 7.52 m depth 76 mm highly fractured rock with clay at 7.77 m depth		RUN-1	70	--	0	--
						RUN-2	90	--	45	--

Shear test (Cu) △ Field
Sensitivity (S) □ Lab
○ Water content (%)
Atterberg limits (%)
● "N" Value (blows / 12 in.-30 cm)

10 20 30 40 50 60 70 80 90

0.30 m

Bentonite Seal

SOIL LOG WITH GRAPH+WELL 081211-INSCRA.GPJ INSPEC_SOL.GDT 3/14/13

REFERENCE No.: 081211 ENCLOSURE No.: 2

BOREHOLE No.: MW2-13
ELEVATION: 81.46 m

BOREHOLE REPORT

Page: 2 of 2

CLIENT: Mondelez Canada Inc.
PROJECT: Preliminary Geotechnical Investigation
LOCATION: 2150 Lake Shore Blvd. West, Toronto
DESCRIBED BY: K. Vander Meulen CHECKED BY: S. Shahangian
DATE (START): January 29, 2013 DATE (FINISH): January 29, 2013

LEGEND
- PQ - PQ size continue coring
- ST - SHELBY TUBE
- RC - ROCK CORE
- WATER LEVEL

Depth (bgs) Feet	Depth (bgs) Metres	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery %	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index/SCR N
		81.46		GROUND SURFACE						
				100 mm fractured rock with clay at 8.01 m depth 13 mm clay seam at 9.04 m depth 25.4 mm limestone 9.23 m depth		RUN-3	100	--	86	--
						RUN-4	100	--	85	--
						RUN-5	100	--	64	--
						RUN-6	100	--	58	--
	15.34	66.12								

Shear test (Cu) △ Field ☐ Lab; Sensitivity (S); ○ Water content (%); W_p W_l Atberg limits (%); ● "N" Value (blows / 12 in.-30 cm)

10 20 30 40 50 60 70 80 90

WL 9.93 m 3/4/2013
12.50 m
Bentonite Grout
13.10 m
Sand
Screen
15.40 m

END OF BOREHOLE

- **Borehole terminated at 15.34 m bgs**
- **Borehole dry to 6.9 m bgs**
- **'bgs' denotes below ground surface**
- **Gr, Sa, Si and Cl denotes Gravel, Sand, Silt and Clay respectively**

Ground Water Measurements :
(Surface elevation : 81.46 m)

Date	Depth (m)	Elev. (m)
3/4/2013	9.93	71.53

SOIL LOG WITH GRAPH+WELL 081211-INSCRA.GPJ INSPEC_SOL.GDT 3/14/13

REFERENCE No.: 081211 ENCLOSURE No.: 3

BOREHOLE No.: MW3-13
ELEVATION: 84.83 m

BOREHOLE REPORT

Page: 1 of 2

CLIENT: Mondelez Canada Inc.
PROJECT: Preliminary Geotechnical Investigation
LOCATION: 2150 Lake Shore Blvd. West, Toronto
DESCRIBED BY: K. Vander Meulen CHECKED BY: S. Shahangian
DATE (START): January 31, 2013 DATE (FINISH): January 31, 2013

LEGEND
- PQ - PQ size continue coring
- ST - SHELBY TUBE
- RC - ROCK CORE
- WATER LEVEL

Depth (bgs) Feet	Depth (bgs) Metres	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery %	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index/SCR N
		84.83		GROUND SURFACE						
	0.15	84.68		TOPSOIL : 150 mm						
				ML-SILT (FILL), trace clay, very loose to compact, brown, moist, highly oxidized		SS-1	50	20	0-0-0-4	0
						SS-2	100	17	5-5-5-5	10
						SS-3	62	18	4-4-3-2	7
	2.13	82.70		trace sand, black/grey, brick fragments						
				CL-SILTY CLAY, soft, low plasticity, brown, moist		SS-4	100	20	2-1-3-4	4
	3.35	81.48		CL-ML-SILTY CLAY/CLAYEY SILT, brown, moist, stiff to very stiff		SS-5	77	17	3-6-8-12	14
						SS-6	92	22	5-6-12-14	18
				trace clay		SS-7	72	22	10-12-13-14	25
	5.18	79.65		CL-SILTY CLAY, firm, plastic, grey, very moist to wet		SS-8	30	25	3-4-4-4	8
						SS-9	82	25	3-2-3-4	5
	6.86	77.97		SHALE (GEORGIAN BAY FORMATION), highly to completely weathered (inferred), with clay inclusion, grey		SS-10		7	85-36-70-70/ 125mm	100
	7.40	77.43		SHALE (GEORGIAN BAY FORMATION), with interbedded limestone, fine grained siltstone, fissile, thinly-bedded to thinly laminated, grey 130 mm of highly fractured rock at 7.42 m depth 40 mm clay lens at 7.53 m depth horizontal fracture with clay infill at 7.8 m depth		RUN-1	90	--	38	--
						RUN-2	100	--	65	--

Shear test (Cu) △ Field ☐ Lab; Sensitivity (S); ○ Water content (%); W_p W_l Atberg limits (%); ● "N" Value (blows / 12 in.-30 cm)

10 20 30 40 50 60 70 80 90

0.30 m
Bentonite Seal
WL 2.9 m 3/4/2013
3.70 m
Sand
Screen
7.30 m

SOIL LOG WITH GRAPH+WELL 081211-INSCRA.GPJ INSPEC_SOL.GDT 3/14/13

REFERENCE No.: 081211 ENCLOSURE No.: 3

BOREHOLE No.: MW3-13
ELEVATION: 84.83 m

BOREHOLE REPORT

Page: 2 of 2

CLIENT: Mondelez Canada Inc.
PROJECT: Preliminary Geotechnical Investigation
LOCATION: 2150 Lake Shore Blvd. West, Toronto
DESCRIBED BY: K. Vander Meulen CHECKED BY: S. Shahangian
DATE (START): January 31, 2013 DATE (FINISH): January 31, 2013

LEGEND
- PQ - PQ size continue coring
- ST - SHELBY TUBE
- RC - ROCK CORE
- WATER LEVEL

Depth (bgs) Feet	Depth (bgs) Metres	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index/SCR
		84.83		GROUND SURFACE			%			N
				80 mm highly fractured rock with clay at 7.98 m depth 80 mm of fractured rock horizontal fracture 50 mm fractured rock 80 mm fractured rock at 10.14 m depth		RUN-3	100	--	76	--
	10.61	74.22		END OF BOREHOLE ● **Borehole terminated at 10.61 m bgs** ● **Borehole dry upon completion** ● **'bgs' denotes below ground surface** **Ground Water Measurements :** **(Surface elevation : 84.83 m)** **Date Depth (m) Elev. (m)** **3/4/2013 2.90 81.93**						

Shear test (Cu) △ Field; Sensitivity (S) ☐ Lab; ○ Water content (%); W_p W_l Atterberg limits (%); ● "N" Value (blows / 12 in.-30 cm)

10 20 30 40 50 60 70 80 90

Bentonite Seal

10.61 m

SOIL LOG WITH GRAPH+WELL 081211-INSCRA.GPJ INSPEC_SOL.GDT 3/14/13

REFERENCE No.: 081211 ENCLOSURE No.: 4

BOREHOLE No.: MW4-13
ELEVATION: 84.20 m

BOREHOLE REPORT

Page: 1 of 2

CLIENT: Mondelez Canada Inc.
PROJECT: Preliminary Geotechnical Investigation
LOCATION: 2150 Lake Shore Blvd. West, Toronto
DESCRIBED BY: K. Vander Meulen CHECKED BY: S. Shahangian
DATE (START): February 1, 2013 DATE (FINISH): February 1, 2013

LEGEND
- PQ - PQ size continue coring
- ST - SHELBY TUBE
- RC - ROCK CORE
- WATER LEVEL

Depth (bgs) Feet	Depth (bgs) Metres	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index/SCR
		84.20		GROUND SURFACE			%			N
	0.15	84.05		ASPHALT : 125 mm						
				SW-GW SAND & GRAVEL (FILL), compact, brown, moist, cobbles		SS-1	82	4	10-11-11-9	22
	0.91	83.29		ML-SILT, trace clay, loose, dark brown, moist		SS-2	82	22	4-4-5-4	9
				very moist to wet, slightly dilatant, slightly oxidized		SS-3	100	21	3-4-4-5	8
	2.29	81.91		CL-SILTY CLAY, trace sand, stiff, low plasticity, brown, moist Gr : 0%, Sa : 2%, Si : 69%, Cl : 29%		SS-4	82	23	5-5-7-8	12
						SS-5	100	31	3-4-5-7	9
	4.12	80.08		SHALE (GEORGIAN BAY FORMATION), highly to completely weathered (inferred), with clay inclusion, grey		SS-6	72	10	24-15-25-30	40
						SS-7	50	8	13-14-25/ 75mm	100
	5.18	79.02		SHALE (GEORGIAN BAY FORMATION), with interbedded limestone, siltstone, fissile, thinly-bedded to thinly laminated, grey 100 mm section of limestone at 5.82 m depth 13 mm horizontal and vertical fracture 5.84 m depth 40 mm horizontal fracture with clay infill at 6.23 m depth 13 mm clay seam at 6.33 m depth 25 mm highly fractured rock at 6.36 m depth 50 mm vertical fracture at 6.4 m depth 13 mm horizontal and vertical fracture at 6.89 m depth 13 mm highly fractured rock at 6.91 m depth		RUN-1	100	--	60	--
						RUN-2	80	--	45	--
						RUN-3	100	--	30	--
	8.23	75.97		END OF BOREHOLE ● **Borehole terminates at 8.23 m bgs** ● **Borehole dry to 5.2 m bgs**						

Shear test (Cu) △ Field; Sensitivity (S) ☐ Lab; ○ Water content (%); W_p W_l Atterberg limits (%); ● "N" Value (blows / 12 in.-30 cm)

10 20 30 40 50 60 70 80 90

0.30 m
Bentonite Seal
WL 1.44 m
3/4/2013
1.80 m
Sand
Screen
5.20 m
Bentonite Seal
8.20 m

SOIL LOG WITH GRAPH+WELL 081211-INSCRA.GPJ INSPEC_SOL.GDT 3/12/13

REFERENCE No.: 081211 ENCLOSURE No.: 4

BOREHOLE No.: MW4-13
ELEVATION: 84.20 m

BOREHOLE REPORT

Page: 2 of 2

CLIENT: Mondelez Canada Inc.
PROJECT: Preliminary Geotechnical Investigation
LOCATION: 2150 Lake Shore Blvd. West, Toronto
DESCRIBED BY: K. Vander Meulen CHECKED BY: S. Shahangian
DATE (START): February 1, 2013 DATE (FINISH): February 1, 2013

LEGEND
- PQ - PQ size continue coring
- ST - SHELBY TUBE
- RC - ROCK CORE
- WATER LEVEL

Depth (bgs) Feet	Depth (bgs) Metres	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery %	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index/SCR N
		84.20		GROUND SURFACE						

Shear test (Cu) △ Field; Sensitivity (S) ☐ Lab; ○ Water content (%); W_p W_l Atterberg limits (%); ● "N" Value (blows / 12 in.-30 cm); 10 20 30 40 50 60 70 80 90

● 'bgs' denotes below ground surface
● Gr, Sa, Si and Cl denotes Gravel, Sand, Silt and Clay respectively

Ground Water Measurements :
(Surface elevation : 84.20 m)

Date	Depth (m)	Elev. (m)
3/4/2013	1.44	82.76

SOIL LOG WITH GRAPH+WELL 081211-INSCRA.GPJ INSPEC_SOL.GDT 3/12/13

REFERENCE No.: 081211 ENCLOSURE No.: 5

BOREHOLE No.: MW5-13
ELEVATION: 85.04 m

BOREHOLE REPORT

Page: 1 of 2

CLIENT: Mondelez Canada Inc.
PROJECT: Preliminary Geotechnical Investigation
LOCATION: 2150 Lake Shore Blvd. West, Toronto
DESCRIBED BY: K. Vander Meulen CHECKED BY: S. Shahangian
DATE (START): February 4, 2013 DATE (FINISH): February 4, 2013

LEGEND
- PQ - PQ size continue coring
- ST - SHELBY TUBE
- RC - ROCK CORE
- WATER LEVEL

Depth (bgs) Feet	Depth (bgs) Metres	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery %	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index/SCR N
		85.04		GROUND SURFACE						
	0.10	84.94		TOPSOIL : 100 mm						
				ML-SILT, trace clay, loose, brown, moist, oxidized		SS-1	50	18	3-3-3-5	6
						SS-2	50	18	3-2-3-4	5
						SS-3	50	15	2-3-2-4	5
				compact, highly oxidized		SS-4	62	16	10-12-15-23	27
				grey		SS-5	100	14	8-12-13-13	25
	3.66	81.38		CL-SILTY CLAY, stiff, plastic, grey, moist						
						SS-6	100	22	4-5-6-6	11
				firm, plastic, very moist		SS-7	100	27	2-3-3-3	6
				soft, very moist to wet Gr : 1%, Sa : 7%, Si : 45%, Cl : 47%		SS-8	100	28	2-1-2-3	3
	6.40	78.64		SHALE (GEORGIAN BAY FORMATION), highly to completely weathered (inferred). with clay inclusion. grey		SS-9	82	13	20-8-17-23/ 75mm	25
	7.21	77.83		80 mm of highly fractured rock						
				SHALE (GEORGIAN BAY FORMATION), with interbedded limestone, siltstone, fissile, thinly-bedded to thinly laminated, grey 100 mm of highly fractured rock at 7.37 m depth 25 mm clay seam at 8.26 m depth 13 mm clay seam at 8.31 m depth 25 mm clay seam at 8.59 m depth 25 mm clay seam at 8.72 m depth		RUN-1	75	--	0	--
						RUN-2	100	--	74	--

Shear test (Cu) △ Field; Sensitivity (S) ☐ Lab; ○ Water content (%); W_p W_l Atterberg limits (%); ● "N" Value (blows / 12 in.-30 cm); 10 20 30 40 50 60 70 80 90

0.30 m

Bentonite Seal

SOIL LOG WITH GRAPH+WELL 081211-INSCRA.GPJ INSPEC_SOL.GDT 3/14/13

REFERENCE No.: 081211 ENCLOSURE No.: 5

BOREHOLE No.: MW5-13
ELEVATION: 85.04 m

BOREHOLE REPORT

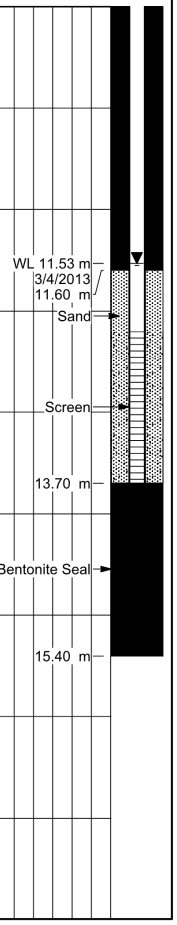
Page: 2 of 2

CLIENT: Mondelez Canada Inc.
PROJECT: Preliminary Geotechnical Investigation
LOCATION: 2150 Lake Shore Blvd. West, Toronto
DESCRIBED BY: K. Vander Meulen CHECKED BY: S. Shahangian
DATE (START): February 4, 2013 DATE (FINISH): February 4, 2013

LEGEND
- PQ - PQ size continue coring
- ST - SHELBY TUBE
- RC - ROCK CORE
- WATER LEVEL

Shear test (Cu) △ Field ☐ Lab
Sensitivity (S)
○ Water content (%)
W_p W_l Atterberg limits (%)
● "N" Value (blows / 12 in.-30 cm)

Depth (bgs) Feet	Depth (bgs) Metres	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery %	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index/SCR N
		85.04		GROUND SURFACE						
				80 mm vertical fracture at 8.84 m depth 25 mm highly horizontal and vertical fractures at 9.33 m depth 25 mm vertical fracture at 9.76 m depth 25 mm clay seam at 10.06 m depth		RUN-3	100	--	70	--
				25 mm clay seam at 10.52 m depth vertical fracture at 10.57 m depth 25 mm vertical fracture at 10.9 m depth		RUN-4	96	--	90	--
						RUN-5	100	--	86	--
				50 mm fracture at 13.75 m depth 50 mm vertical fracture at 14.21 m depth		RUN-6	100	--	77	--
	15.39	69.65		END OF BOREHOLE						



- **Borehole terminates at 15.39 m bgs**
- **Borehole dry to 7.2 m bgs**
- **'bgs' denotes below ground surface**
- **Gr, Sa, Si and Cl denotes Gravel, Sand, Silt and Clay respectively**

Ground Water Measurements :
(Surface elevation : 85.04 m)

Date	Depth (m)	Elev. (m)
3/4/2013	11.53	73.51

SOIL LOG WITH GRAPH+WELL 081211-INSCRA.GPJ INSPEC_SOL.GDT 3/14/13

REFERENCE No.: 081211 ENCLOSURE No.: 6

BOREHOLE No.: MW6-13
ELEVATION: 86.20 m

BOREHOLE REPORT

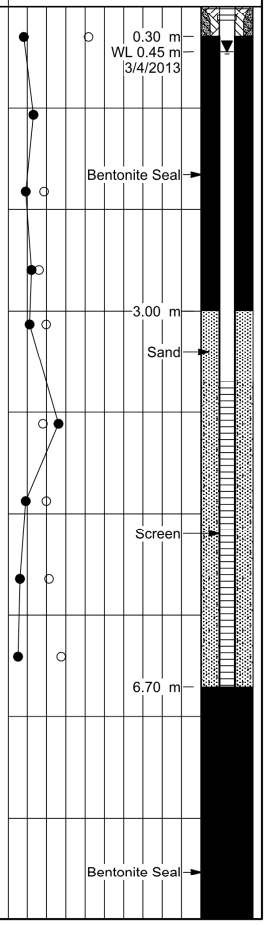
Page: 1 of 2

CLIENT: Mondelez Canada Inc.
PROJECT: Preliminary Geotechnical Investigation
LOCATION: 2150 Lake Shore Blvd. West, Toronto
DESCRIBED BY: K. Vander Meulen CHECKED BY: S. Shahangian
DATE (START): February 5, 2013 DATE (FINISH): February 5, 2013

LEGEND
- PQ - PQ size continue coring
- ST - SHELBY TUBE
- RC - ROCK CORE
- WATER LEVEL

Shear test (Cu) △ Field ☐ Lab
Sensitivity (S)
○ Water content (%)
W_p W_l Atterberg limits (%)
● "N" Value (blows / 12 in.-30 cm)

Depth (bgs) Feet	Depth (bgs) Metres	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery %	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index/SCR N
		86.20		GROUND SURFACE						
	0.08	86.12		TOPSOIL : 75 mm						
				SM-SILTY SAND (FILL), trace clay, loose, brown, moist, oxidized		SS-1	82	42	4-2-6-6	8
	0.61	85.59		ML-SILT, trace sand, compact, brown, moist, oxidized		SS-2	62	--	5-6-7-8	13
	1.22	84.98		CL-SILTY CLAY, stiff, plastic, grey, moist		SS-3	100	19	4-4-5-5	9
						SS-4	100	16	3-5-7-11	12
	2.74	83.46		ML-SILT, trace clay, compact, grey, moist		SS-5	100	20	4-5-6-10	11
						SS-6	92	18	5-10-16-10	26
	4.57	81.63		CL-SILTY CLAY, stiff, low plasticity, grey, moist		SS-7	100	20	2-4-5-8	9
				trace silt, firm, plastic, very moist		SS-8	92	21	2-3-3-4	6
						SS-9	100	27	2-2-3-55/ 125mm	5
	6.55	79.65		SHALE (GEORGIAN BAY FORMATION), highly to completely weathered (inferred), with clay inclusion, grey						
	7.30	78.90		SHALE (GEORGIAN BAY FORMATION), with interbedded limestone, siltstone, fissile, thinly-bedded to thinly laminated, grey 76 mm highly fractured rock with clay at 8.16 m depth 50 mm highly fractured rock at 8.59 m depth		RUN-1	70	--	50	--



SOIL LOG WITH GRAPH+WELL 081211-INSCRA.GPJ INSPEC_SOL.GDT 3/12/13

REFERENCE No.: 081211 ENCLOSURE No.: 6

BOREHOLE No.: MW6-13
ELEVATION: 86.20 m

BOREHOLE REPORT

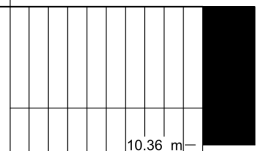
Page: 2 of 2

CLIENT: Mondelez Canada Inc.
PROJECT: Preliminary Geotechnical Investigation
LOCATION: 2150 Lake Shore Blvd. West, Toronto
DESCRIBED BY: K. Vander Meulen CHECKED BY: S. Shahangian
DATE (START): February 5, 2013 DATE (FINISH): February 5, 2013

LEGEND
- PQ - PQ size continue coring
- ST - SHELBY TUBE
- RC - ROCK CORE
- WATER LEVEL

Depth (bgs) Feet	Depth (bgs) Metres	Elevation (m) 86.20	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery %	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index/SCR N
				GROUND SURFACE						
				101 mm fractured rock at 9.23 m depth with clay infill at 9.5 m depth with clay infill at 9.65 m depth 25 mm fracture with clay at 9.86 m depth 100 mm highly fractured rock at 9.94 m depth 152 mm vertical fracture at 10.06 m depth		RUN-2	100	--	50	--
	10.36	75.84		END OF BOREHOLE ● Borehole terminates at 10.36 m bgs ● Borehole dry to 7.3 m bgs ● 'bgs' denotes below ground surface Ground Water Measurements : (Surface elevation : 86.20 m) Date Depth (m) Elev. (m) 3/4/2013 0.45 87.75						

Shear test (Cu) △ Field; Sensitivity (S) ☐ Lab; ○ Water content (%); W_p W_l Atterberg limits (%); ● "N" Value (blows / 12 in.-30 cm)



SOIL LOG WITH GRAPH+WELL 081211-INSCRA.GPJ INSPEC_SOL.GDT 3/12/13

REFERENCE No.: 081211 ENCLOSURE No.: 7

BOREHOLE No.: MW7-13
ELEVATION: 86.72 m

BOREHOLE REPORT

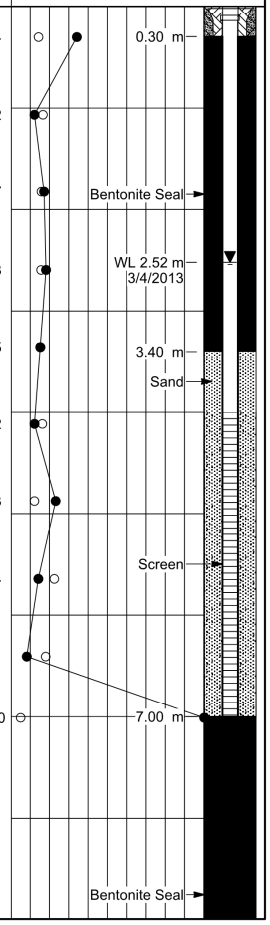
Page: 1 of 2

CLIENT: Mondelez Canada Inc.
PROJECT: Preliminary Geotechnical Investigation
LOCATION: 2150 Lake Shore Blvd. West, Toronto
DESCRIBED BY: K. Vander Meulen CHECKED BY: S. Shahangian
DATE (START): February 6, 2013 DATE (FINISH): February 6, 2013

LEGEND
- PQ - PQ size continue coring
- ST - SHELBY TUBE
- RC - ROCK CORE
- WATER LEVEL

Depth (bgs) Feet	Depth (bgs) Metres	Elevation (m) 86.72	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery %	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index/SCR N
				GROUND SURFACE						
	0.08	86.64		TOPSOIL : 75 mm						
				SM-SILTY SAND (FILL), trace clay, trace gravel, brown, moist, dense		SS-1	82	14	32-25-9-11	34
	0.61	86.11		ML-SILT (FILL), trace clay, compact, brown, moist						
						SS-2	100	16	5-5-7-8	12
						SS-3	100	16	5-7-10-11	17
	2.59	84.13		Sandy CL-SILTY CLAY, stiff to very stiff, low plasticity, grey, moist		SS-4	100	15	5-8-10-13	18
						SS-5	100	15	5-7-8-10	15
						SS-6	100	16	3-5-7-12	12
						SS-7	100	12	5-7-16-17	23
						SS-8	100	22	10-5-9-7	14
				firm, plastic		SS-9	50	18	2-3-5-6	8
	6.86	79.86		SHALE (GEORGIAN BAY FORMATION), highly to completely weathered (inferred), grey		SS-10	50	5	60/ 125mm	100
	7.32	79.40		SHALE (GEORGIAN BAY FORMATION), with interbedded limestone, siltstone, fissile, thinly-bedded to thinly laminated, soft, grey 25 mm horizontal and vertical fracture at 7.5 m depth 76 mm horizontal and vertical fracture at 8.33 m depth 76 mm horizontal and vertical fracture at		RUN-1	100	--	70	--

Shear test (Cu) △ Field; Sensitivity (S) ☐ Lab; ○ Water content (%); W_p W_l Atterberg limits (%); ● "N" Value (blows / 12 in.-30 cm)



SOIL LOG WITH GRAPH+WELL 081211-INSCRA.GPJ INSPEC_SOL.GDT 3/12/13

REFERENCE No.: 081211 ENCLOSURE No.: 7

BOREHOLE No.: MW7-13
ELEVATION: 86.72 m

BOREHOLE REPORT

Page: 2 of 2

CLIENT: Mondelez Canada Inc.
PROJECT: Preliminary Geotechnical Investigation
LOCATION: 2150 Lake Shore Blvd. West, Toronto
DESCRIBED BY: K. Vander Meulen CHECKED BY: S. Shahangian
DATE (START): February 6, 2013 DATE (FINISH): February 6, 2013

LEGEND
- PQ - PQ size continue coring
- ST - SHELBY TUBE
- RC - ROCK CORE
- WATER LEVEL

Depth (bgs) Feet	Depth (bgs) Metres	Elevation (m) 86.72	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery %	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index/SCR N
				GROUND SURFACE						
				8.72 m depth clay lens at 8.99 m depth		RUN-2	100	--	70	--
				50 mm highly fractured rock at 10.09 m depth						
	10.52	76.20		25 mm horizontal and vertical fracture at 10.42 m depth						

END OF BOREHOLE

- **Borehole terminates at 10.52 m bgs**
- **Borehole dry to 7.3 m depth**
- **'bgs' denotes below ground surface**

Ground Water Measurements :
(Surface elevation : 86.72 m)

Date	Depth (m)	Elev. (m)
3/4/2013	2.52	84.20

Shear test (Cu) △ Field; Sensitivity (S) □ Lab; ○ Water content (%); W_p W_l Atterberg limits (%); ● "N" Value (blows / 12 in.-30 cm)

10 20 30 40 50 60 70 80 90

10.52 m

SOIL LOG WITH GRAPH+WELL 081211-INSCRA.GPJ INSPEC_SOL.GDT 3/12/13

REFERENCE No.: 081211 ENCLOSURE No.: 8

BOREHOLE No.: MW8-13
ELEVATION: 83.98 m

BOREHOLE REPORT

Page: 1 of 2

CLIENT: Mondelez Canada Inc.
PROJECT: Preliminary Geotechnical Investigation
LOCATION: 2150 Lake Shore Blvd. West, Toronto
DESCRIBED BY: K. Vander Meulen CHECKED BY: S. Shahangian
DATE (START): February 8, 2013 DATE (FINISH): February 8, 2013

LEGEND
- PQ - PQ size continue coring
- ST - SHELBY TUBE
- RC - ROCK CORE
- WATER LEVEL

Depth (bgs) Feet	Depth (bgs) Metres	Elevation (m) 83.98	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery %	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index/SCR N
				GROUND SURFACE						
	0.15	83.83		ASPHALT : 125 mm						
				SW-GW SAND AND GRAVEL (FILL), loose, brown, moist, trace cobbles		SS-1	62	5	22-6-3-3	9
	0.91	83.07		ML-SILT, trace clay, loose, grey, very moist to wet, dilatant		SS-2	100	23	2-2-3-4	5
				trace sand, wet, dilatant, very loose		SS-3	62	23	2-1-2-4	3
	2.29	81.69		CL-SILTY CLAY, soft, plastic, grey, very moist to wet		SS-4	100	26	2-2-1-3	3
						SS-5	100	29	2-1-2-3	3
	3.81	80.17		trace sand and gravel, soft, plastic		SS-6	100	27	2-1-3-4	4
						SS-7	100	17	2-2-4-5	6
	5.34	78.64		SHALE (GEORGIAN BAY FORMATION), highly to completely weathered (inferred), grey		SS-8		--	59/15mm	100
	5.60	78.38		SHALE (GEORGIAN BAY FORMATION), with interbedded limestone, siltstone, fissile, thinly-bedded to thinly laminated, grey		RUN-1	75	--	75	--
						RUN-2	100	--	96	--
				61 cm of horizontal and vertical rock at 7.77 m depth 50 mm vertical fracture at 8.03 m depth 25 mm of clay at 8.23 m depth		RUN-3	95	--	60	--

Shear test (Cu) △ Field; Sensitivity (S) □ Lab; ○ Water content (%); W_p W_l Atterberg limits (%); ● "N" Value (blows / 12 in.-30 cm)

10 20 30 40 50 60 70 80 90

0.30 m
Bentonite Seal
WL 7.94 m
3/4/2013
8.50 m
Sand

SOIL LOG WITH GRAPH+WELL 081211-INSCRA.GPJ INSPEC_SOL.GDT 3/12/13

REFERENCE No.: 081211 ENCLOSURE No.: 8

BOREHOLE No.: MW8-13
ELEVATION: 83.98 m

BOREHOLE REPORT

Page: 2 of 2

CLIENT: Mondelez Canada Inc.
PROJECT: Preliminary Geotechnical Investigation
LOCATION: 2150 Lake Shore Blvd. West, Toronto
DESCRIBED BY: K. Vander Meulen CHECKED BY: S. Shahangian
DATE (START): February 8, 2013 DATE (FINISH): February 8, 2013

LEGEND
- PQ - PQ size continue coring
- ST - SHELBY TUBE
- RC - ROCK CORE
- WATER LEVEL

Depth (bgs) Feet	Depth (bgs) Metres	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery %	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index/SCR N
		83.98		GROUND SURFACE						
						RUN-4	100	--	95	--
						RUN-5	100	--	100	--
						RUN-6	100	--	100	--
	13.90	70.08		76 mm vertical fracture at 13.62 m depth						

Shear test (Cu) △ Field; Sensitivity (S) ☐ Lab; ○ Water content (%); Atterberg limits (%) W_p W_l; ● "N" Value (blows / 12 in.-30 cm)

Screen
10.70 m
Bentonite Seal
13.90 m

END OF BOREHOLE

- **Borehole terminates at 13.90 m bgs**
- **Borehole dry to 5.6 m depth**
- **'bgs' denotes below ground surface**

Ground Water Measurements :
(Surface elevation : 83.98 m)

Date	Depth (m)	Elev. (m)
3/4/2013	7.94	76.04

SOIL LOG WITH GRAPH+WELL 081211-INSCRA.GPJ INSPEC_SOL.GDT 3/12/13

REFERENCE No.: 081211 ENCLOSURE No.: 9

BOREHOLE No.: MW9-13
ELEVATION: 84.44 m

BOREHOLE REPORT

Page: 1 of 2

CLIENT: Mondelez Canada Inc.
PROJECT: Preliminary Geotechnical Investigation
LOCATION: 2150 Lake Shore Blvd. West, Toronto
DESCRIBED BY: K. Vander Meulen CHECKED BY: S. Shahangian
DATE (START): January 30, 2013 DATE (FINISH): January 30, 2013

LEGEND
- PQ - PQ size continue coring
- ST - SHELBY TUBE
- RC - ROCK CORE
- WATER LEVEL

Depth (bgs) Feet	Depth (bgs) Metres	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery %	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index/SCR N
		84.44		GROUND SURFACE						
	0.10	84.34		ASPHALT : 100 mm						
				SP-SAND (FILL), compact, brown, moist		SS-1	72	7	11-11-8-8	19
	1.22	83.22		ML-SILT, trace clay, compact, brown, moist		SS-2	62	14	4-5-7-11	12
				some clay, loose		SS-3	92	21	5-3-5-6	8
	2.29	82.15		CL-SILTY CLAY, soft, plastic, brown, moist		SS-4	62	23	3-2-2-2	4
	3.20	81.24		ML-SILT, trace clay, compact, brown, moist		SS-5	100	20	4-5-8-9	13
				some clay		SS-6	100	23	3-5-8-11	13
	4.57	79.87		CL-SILTY CLAY, stiff, low plasticity, grey, moist		SS-7	82	22	3-4-5-5	9
				Gr : 0%, Sa : 0%, Si : 70%, Cl : 30%						
				firm, plastic, very moist to wet		SS-8	100	20	3-4-3-4	7
						SS-9	92	30	2-3-2-3	5
	6.86	77.58		SHALE (GEORGIAN BAY FORMATION), highly to completely weathered (inferred), grey		SS-10	100	3	26-71-50/ 125mm	100
	7.40	77.04		SHALE (GEORGIAN BAY FORMATION), with interbedded limestone, siltstone, fissile, thinly-bedded to thinly laminated, grey highly fractured with clay at 7.47 m depth 25 mm horizontal fracture at 7.97 m depth		RUN-1	100	--	80	--
						RUN-2	100	--	83	--

Shear test (Cu) △ Field; Sensitivity (S) ☐ Lab; ○ Water content (%); Atterberg limits (%) W_p W_l; ● "N" Value (blows / 12 in.-30 cm)

0.30 m
Bentonite Seal
2.70 m
WL 2.74 m
3/4/2013
Sand
Screen
6.40 m
Bentonite Seal

SOIL LOG WITH GRAPH+WELL 081211-INSCRA.GPJ INSPEC_SOL.GDT 3/12/13

REFERENCE No.: 081211

ENCLOSURE No.: 9

BOREHOLE No.: MW9-13

ELEVATION: 84.44 m

BOREHOLE REPORT

Page: 2 of 2

CLIENT: Mondelez Canada Inc.

PROJECT: Preliminary Geotechnical Investigation

LOCATION: 2150 Lake Shore Blvd. West, Toronto

DESCRIBED BY: K. Vander Meulen CHECKED BY: S. Shahangian

DATE (START): January 30, 2013 DATE (FINISH): January 30, 2013

LEGEND

- PQ - PQ size continue coring
- ST - SHELBY TUBE
- RC - ROCK CORE
- WATER LEVEL

Depth (bgs) Feet	Depth (bgs) Metres	Elevation (m) 84.44	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery %	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index/SCR N
				GROUND SURFACE						
				13 mm clay seam at 9.65 m depth 40 mm highly fractured rock at 9.87 m depth 13 mm clay seam at 9.91 m depth 40 mm horizontal fracture with clay infill at 10.09 m depth 13 mm highly fractured rock at 10.14 m depth		RUN-3	100	--	64	--
	10.55	73.89								

Shear test (Cu) △ Field ☐ Lab; Sensitivity (S); ○ Water content (%); W_p W_l Atterberg limits (%); ● "N" Value (blows / 12 in.-30 cm)

10 20 30 40 50 60 70 80 90

10.55 m

END OF BOREHOLE

- **Borehole terminates at 10.55 m bgs**
- **Borehole dry to 7.4 m depth**
- **'bgs' denotes below ground surface**
- **Gr, Sa, Si and Cl denotes Gravel, Sand, Silt and Clay respectively**

Ground Water Measurements :
(Surface elevation : 84.44 m)

Date	Depth (m)	Elev. (m)
3/4/2013	2.74	81.70

SOIL LOG WITH GRAPH+WELL_081211-INSCRA.GPJ INSPEC_SOL.GDT 3/12/13

STRATIGRAPHIC LOG

Page 1 of 1

PROJECT NAME: UST CLOSURE SERVICES
PROJECT NUMBER: 32985-01
CLIENT: KRAFT CANADA INC.
LOCATION: 2150 LAKESHORE BLVD. W., TORONTO, ONTARIO

HOLE DESIGNATION: BH2-04
DATE COMPLETED: 22 January 2004
DRILLING METHOD: DIRECT-PUSH
FIELD PERSONNEL: K. PETER

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	SAMPLE NUMBER	SAMPLE INTERVAL	PID (ppm)
	ASPHALT	0.09			
	SAND and GRAVEL (FILL), compact to dense, coarse grained, well graded, brown, dry				
0.5	ML/CL - SILTY CLAY, firm to stiff, mottled gray/olive, moist	0.61	1	0.00 - 1.22	5
1.0					
1.5	- wet to saturated at 1.52m BGS				
2.0	- thin silty sand seams (less than 1cm thick), gray, slight petroleum hydrocarbon odour at 1.83m BGS		2	1.22 - 2.44	2
2.5					
3.0			3	2.44 - 3.35	42
	- moist to wet at 3.20m BGS - gray with brown mottling, no odour at 3.35m BGS				
3.5					
4.0			4	3.35 - 4.27	11.5
4.5	- silt, with clay, with sand, mottled brown/olive, moist to wet at 4.42m BGS				
5.0			5	4.27 - 5.18	28
	ML - SILT (WATERLAIN), stiff, gray, moist	5.03			
	END OF TEST PIT @ 5.18m BGS	5.18			
5.5					
6.0					
6.5					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯

TEST PIT LOG 32985-01.GPJ CRA_CORP.GDT 21/5/04

STRATIGRAPHIC LOG

PROJECT NAME: UST CLOSURE SERVICES
PROJECT NUMBER: 32985-01
CLIENT: KRAFT CANADA INC.
LOCATION: 2150 LAKESHORE BLVD. W., TORONTO, ONTARIO

HOLE DESIGNATION: BH3-04
DATE COMPLETED: 22 January 2004
DRILLING METHOD: DIRECT-PUSH
FIELD PERSONNEL: K. PETER

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE PID (ppm)
	ASPHALT	0.15			
	SAND and GRAVEL (FILL), compact to dense, coarse grained, well graded, light brown, dry				
0.5	ML/CL - SILTY CLAY, stiff, dark gray, dry to moist, sligt petroleum hydrocarbon odour	0.61	1	0.00 - 1.22	4
1.0	- soft, wet at 1.22m BGS				
1.5			2	1.22 - 2.44	148
2.0	- moderate to strong petroleum hydrocarbon odour at 2.13m BGS				
2.5	- thin sand silt seams (less than 1cm thick), moderate to strong petroleum hydrocarbon odour at 2.44m BGS				
	- slight odour at 2.74m BGS		3	2.44 - 3.35	78
3.0	- no odour at 3.05m BGS				
3.5			4	3.35 - 4.27	2
4.0					
4.5	- soft, very moist to wet at 4.57m BGS		5	4.27 - 5.18	1
5.0					
	END OF TEST PIT @ 5.18m BGS	5.18			
5.5					
6.0					
6.5					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯

TEST PIT LOG 32985-01.GPJ CRA_CORP.GDT 21/5/04

STRATIGRAPHIC LOG

PROJECT NAME: UST CLOSURE SERVICES
PROJECT NUMBER: 32985-01
CLIENT: KRAFT CANADA INC.
LOCATION: 2150 LAKESHORE BLVD. W., TORONTO, ONTARIO

HOLE DESIGNATION: BH4-04
DATE COMPLETED: 22 January 2004
DRILLING METHOD: DIRECT-PUSH
FIELD PERSONNEL: K. PETER

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE PID (ppm)
	ASPHALT	0.15			
	SAND and GRAVEL (FILL), compact to dense, coarse grained, well graded, light brown, dry				
0.5	- with silt, trace gravel at 0.46m BGS		1	0.00 - 1.22	7
	ML/CL - SILTY CLAY, stiff, dark gray, moist, black staining, petroleum hydrocarbon odour	0.76			
1.0					
1.5	- soft, mottled brown/gray, saturated, strong petroleum hydrocarbon odour at 1.52m BGS		2	1.22 - 2.44	19
2.0					
2.5					
	- trace sand, moderate to slight odour at 2.74m BGS		3	2.44 - 3.35	334
3.0					
	- stiff, moist, no odour at 3.20m BGS				
3.5					
	- soft to firm, very moist to wet at 3.81m BGS		4	3.35 - 4.27	4
4.0	- stiff, moist at 4.11m BGS				
	END OF TEST PIT @ 4.27m BGS	4.27			
4.5					
5.0					
5.5					
6.0					
6.5					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯

TEST PIT LOG 32985-01.GPJ CRA_CORP.GDT 21/5/04

STRATIGRAPHIC LOG

PROJECT NAME: UST CLOSURE SERVICES
PROJECT NUMBER: 32985-01
CLIENT: KRAFT CANADA INC.
LOCATION: 2150 LAKESHORE BLVD. W., TORONTO, ONTARIO

HOLE DESIGNATION: BH5-04
DATE COMPLETED: 22 January 2004
DRILLING METHOD: DIRECT-PUSH
FIELD PERSONNEL: K. PETER

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE PID (ppm)
	ASPHALT	0.15			
	SAND and GRAVEL (FILL), compact to dense, coarse grained, well graded, light brown, dry				
0.5	- sand, with silt, compact, poorly graded, brown, moist at 0.61m BGS		1	0.00 - 1.22	1
1.0		1.22			
	ML/CL - SILTY CLAY, stiff, mottled brown/gray, moist				
1.5	- wet at 1.52m BGS				
			2	1.22 - 2.44	34
2.0	- gray, some brown mottling, moderate petroleum hydrocarbon odour at 1.98m BGS				
2.5	- gray, saturated, strong petroleum hydrocarbon odour at 2.44m BGS				
			3	2.44 - 3.35	125
3.0					
	- slight odour at 3.35m BGS				
3.5					
	- no odour at 3.81m BGS		4	3.35 - 4.27	2
4.0		4.27			
	END OF TEST PIT @ 4.27m BGS				
4.5					
5.0					
5.5					
6.0					
6.5					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯

TEST PIT LOG 32985-01.GPJ CRA_CORP.GDT 21/5/04

STRATIGRAPHIC LOG

PROJECT NAME: UST CLOSURE SERVICES
PROJECT NUMBER: 32985-01
CLIENT: KRAFT CANADA INC.
LOCATION: 2150 LAKESHORE BLVD. W., TORONTO, ONTARIO

HOLE DESIGNATION: BH6-04
DATE COMPLETED: 22 January 2004
DRILLING METHOD: DIRECT-PUSH
FIELD PERSONNEL: K. PETER

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE PID (ppm)
	SAND and GRAVEL (FILL), compact to dense, coarse grained, brown, dry				
0.5	SAND (FILL), loose, fine to medium grained, massive, light brown, dry, no odour	0.46	1	0.00 - 1.22	1.4
1.0	ML/CL - SILTY CLAY, stiff, low plasticity, massive, gray with black mottling, dry to moist	1.01			
	- slight to moderate petroleum hydrocarbon odour at 1.22m BGS				
1.5	- trace sand, soft, gray, saturated, strong petroleum hydrocarbon odour at 1.52m BGS				
			2	1.22 - 2.44	13.5
2.0					
2.5					
			3	2.44 - 3.35	–
3.0					
	- moist, slight petroleum hydrocarbon odour at 3.35m BGS				
3.5	- stiff, mottled gray/brown, no odour at 3.66m BGS				
			4	3.35 - 4.27	2.5
4.0		4.27			
	END OF TEST PIT @ 4.27m BGS				
4.5					
5.0					
5.5					
6.0					
6.5					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯

TEST PIT LOG 32985-01.GPJ CRA_CORP.GDT 21/5/04

STRATIGRAPHIC LOG

PROJECT NAME: UST CLOSURE SERVICES
PROJECT NUMBER: 32985-01
CLIENT: KRAFT CANADA INC.
LOCATION: 2150 LAKESHORE BLVD. W., TORONTO, ONTARIO

HOLE DESIGNATION: BH7-04
DATE COMPLETED: 22 January 2004
DRILLING METHOD: DIRECT-PUSH
FIELD PERSONNEL: K. PETER

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE PID (ppm)
	SAND and GRAVEL (FILL), compact, coarse grained, well graded, light brown/gray, dry				
0.5			1	0.00 - 1.22	0
	SAND (FILL), loose, medium grained, poorly graded, brown, dry to moist	0.76			
1.0					
1.5					
			2	1.22 - 2.44	0
2.0					
2.5	- silty sand, dense, dilatent, saturated at 2.44m BGS				
	- black petroleum hydrocarbon staining, strong petroleum hydrocarbon odour at 2.74m BGS				
3.0			3	2.44 - 3.66	15.5
3.5					
4.0			4	3.66 - 4.72	0
	SANDY SILT, stiff, brown, moist, no odour	4.27			
4.5	END OF TEST PIT @ 4.57m BGS	4.72			
5.0					
5.5					
6.0					
6.5					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯

TEST PIT LOG 32985-01.GPJ CRA_CORP.GDT 21/5/04

STRATIGRAPHIC LOG

PROJECT NAME: UST CLOSURE SERVICES
PROJECT NUMBER: 32985-01
CLIENT: KRAFT CANADA INC.
LOCATION: 2150 LAKESHORE BLVD. W., TORONTO, ONTARIO

HOLE DESIGNATION: BH8-04
DATE COMPLETED: 22 January 2004
DRILLING METHOD: DIRECT-PUSH
FIELD PERSONNEL: K. PETER

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE PID (ppm)
	ASPHALT/CONCRETE				
	SILTY CLAY (FILL), with gravel, stif, mottled gray/brown, dry to moist	0.21			
0.5			1	0.00 - 1.22	0
1.0	ML/CL - SILTY CLAY, stiff, olive, moist, no odour	1.07			
1.5	- soft to firm, dilatent, brown, very moist, no odour at 1.52m BGS				
			2	1.22 - 2.44	0
2.0					
2.5	- stiff, moist at 2.74m BGS				
			3	2.44 - 3.35	0
3.0					
3.5					
			4	3.35 - 4.27	0
4.0					
	END OF TEST PIT @ 4.27m BGS	4.27			
4.5					
5.0					
5.5					
6.0					
6.5					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

TEST PIT LOG 32985-01.GPJ CRA_CORP.GDT 21/5/04

STRATIGRAPHIC LOG

PROJECT NAME: UST CLOSURE SERVICES
PROJECT NUMBER: 32985-01
CLIENT: KRAFT CANADA INC.
LOCATION: 2150 LAKESHORE BLVD. W., TORONTO, ONTARIO

HOLE DESIGNATION: BH9-04
DATE COMPLETED: 23 January 2004
DRILLING METHOD: DIRECT-PUSH
FIELD PERSONNEL: K. PETER

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE PID (ppm)
	ASPHALT	0.09			
	SAND and GRAVEL (FILL), compact to dense, coarse grained, well graded, light brown, dry				
	- with silt at 0.30m BGS	0.46			
0.5	ML/CL - SILTY CLAY, firm to stiff, dark gray, moist, no odour		1	0.00 - 1.22	0
1.0					
1.5					
	- soft, brown mottling, very moist to wet at 1.83m BGS		2	1.22 - 2.44	0
2.0	- sandy seam (10cm thick), light gray at 2.13m BGS				
2.5	- saturated at 2.44m BGS				
3.0			3	2.44 - 3.35	0
3.5	- small sand seams (less than 1cm thick), dark gray/black, no odour at 3.35m BGS				
4.0			4	3.35 - 4.27	0
4.5	- mottled gray/brown at 4.27m BGS				
5.0			5	4.27 - 5.33	0
5.5	END OF TEST PIT @ 5.33m BGS	5.33			
6.0					
6.5					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

TEST PIT LOG 32985-01.GPJ CRA_CORP.GDT 21/5/04

STRATIGRAPHIC LOG

PROJECT NAME: UST CLOSURE SERVICES
PROJECT NUMBER: 32985-01
CLIENT: KRAFT CANADA INC.
LOCATION: 2150 LAKESHORE BLVD. W., TORONTO, ONTARIO

HOLE DESIGNATION: BH10-04
DATE COMPLETED: 23 January 2004
DRILLING METHOD: DIRECT-PUSH
FIELD PERSONNEL: K. PETER

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE PID (ppm)
	ASPHALT	0.09			
	SAND and GRAVEL (FILL), compact to dense, coarse grained, well graded, light brown, dry				
0.5	SAND (FILL), compact, medium grained, poorly graded, brown, moist	0.46	1	0.00 - 1.22	0
1.0					
1.5	ML/CL - SILTY CLAY, stiff, brown with gray mottling, moist	1.52			
			2	1.22 - 2.44	0
2.0					
2.5	- thin gray sand seams (less than 1cm thick), moderate petroleum hydrocarbon odour at 2.59m BGS				
3.0			3	2.44 - 3.35	330
3.5	- stiff, mottled brown/gray, no odour at 3.51m BGS				
4.0			4	3.35 - 4.27	30
4.5	- soft, dilatent, saturated at 4.27m BGS - gray at 4.42m BGS				
5.0			5	4.27 - 5.18	9
5.5	END OF TEST PIT @ 5.18m BGS	5.18			
6.0					
6.5					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯

TEST PIT LOG 32985-01.GPJ CRA_CORP.GDT 21/5/04

STRATIGRAPHIC LOG

PROJECT NAME: UST CLOSURE SERVICES
PROJECT NUMBER: 32985-01
CLIENT: KRAFT CANADA INC.
LOCATION: 2150 LAKESHORE BLVD. W., TORONTO, ONTARIO

HOLE DESIGNATION: BH11-04
DATE COMPLETED: 23 January 2004
DRILLING METHOD: DIRECT-PUSH
FIELD PERSONNEL: K. PETER

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE PID (ppm)
	CONCRETE	0.15			
	SANDY SILT (FILL), stiff, brown, moist				
0.5			1	0.00 - 1.22	4
1.0					
	- saturated at 1.37m BGS				
1.5					
	- black staining, strong petroleum hydrocarbon odour at 1.68m BGS		2	1.22 - 2.44	670
2.0					
	- no staining at 2.29m BGS				
2.5					
	- moist to dry, strong petroleum hydrocarbon odour at 2.59m BGS		3	2.44 - 3.35	150
3.0					
	- moderate odour at 3.05m BGS				
	- sand seam (approximately 10cm thick), saturated at 3.35m BGS				
3.5					
			4	3.35 - 4.27	120
4.0					
	ML - SILT (WATERLAIN), with clay to clayey, with sand, soft, high plasticity, gray, very moist	4.11			
4.5					
			5	4.27 - 5.18	60
5.0					
	- trace clay, low plasticity, saturated at 5.18m BGS				
5.5					
			6	5.18 - 6.10	25
6.0					
	- soft, high plasticity, dilatent, very moist at 6.10m BGS				
6.5			7	6.10 - 6.86	13
	- shale fragments in spoon tip at 6.71m BGS				
	END OF TEST PIT @ 6.86m BGS	6.86			

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯

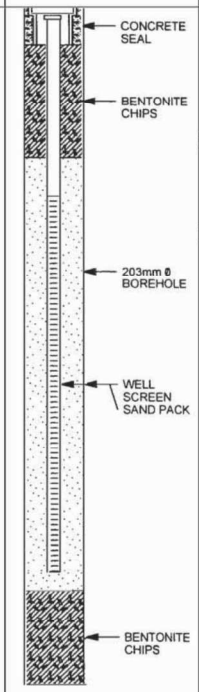
TEST PIT LOG 32985-01.GPJ CRA_CORP.GDT 21/5/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: UST CLOSURE SERVICES
PROJECT NUMBER: 32985-01
CLIENT: KRAFT CANADA INC.
LOCATION: 2150 LAKESHORE BLVD. W., TORONTO, ONTARIO

HOLE DESIGNATION: MW1-04
DATE COMPLETED: January 20, 2004
DRILLING METHOD: 4 1/4" ID HSA
FIELD PERSONNEL: B. IOTZOV

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	ASPHALT						
0.5	SILT and CLAY (FILL), soft, gray, wet to saturated, no odour	0.46					
1.0			1		17	8	0
1.5							
2.0			2		33	4	0
2.5			3		42	1	0
3.0							
3.5			4		8	3	0
4.0	SILT (TILL), with clay to clayey, trace sand, soft, high plasticity, laminated, gray, saturated	3.96	5		58	3	0
4.5							
5.0			6		50	20	0
	SHALE (BEDROCK), gray	5.33	7		0	>50	–
5.5	END OF BOREHOLE @ 5.49m BGS	5.49					
6.0							
6.5							
7.0							



WELL DETAILS
Screened interval:
1.52 to 4.57m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: 10
Material: SCH 40 PVC
Seal:
0.30 to 1.22m BGS
Material: BENTONITE CHIPS
Sand Pack:
1.22 to 4.72m BGS
Material: #1 SILICA SAND

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯

OVERBURDEN LOG 32985-01.GPJ CRA_CORP.GDT 1/3/05